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AN ACCOUNT  
OF THE  
**CRUSTACEA**  
OF  
NORWAY





AN ACCOUNT  
OF THE  
CRUSTACEA  
OF  
NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY

G. O. SARS

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VOL. VIII

COPEPODA  
MONSTRILLOIDA & NOTODELPHYOIDA  
WITH 37 AUTOTYPIC PLATES



BERGEN

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BERGEN, A.S. JOHN GRIEGS BOKTRYKKERI OG N. NILSEN & SØN

## PREFACE.

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By this Volume I definitely conclude my Account of the Norwegian *Copepoda*, it being my purpose in the next Volume to enter upon an entirely different group of Crustacea, viz., the *Ostracoda*. Although my Account of the former group has required no less than 5 Volumes, and more than 500 species have been described, I do not by any means imagine, that it gives a fully exhaustive record of the existing forms, and I am indeed convinced that many interesting species still remain to be detected, especially of the smaller deep-water Harpacticoida and of the semiparasitic forms. Yet, I hope that my Account may have thrown some light on this formerly much neglected part of our Fauna, and that it may serve as the basis for further investigations.

As to the two anomalous groups treated of in the present Volume, no record whatever has as yet been given on the Norwegian forms belonging to them.

I will not omit, also on this occasion, to tender my most sincere thanks to the Direction of the Bergen Museum for the interest, it still shows for the progress of my work.

G. O. Sars



## INTRODUCTION.

In the present volume I propose to give an account of 2 anomalous groups of *Copepoda*, viz., the *Monstrilloida* and the *Notodelphyoida*, the systematic position of which has not been fully recognised by earlier authors. In the more recent classification of the *Copepoda* proposed by Giesbrecht, and now generally adopted by carcinologists, only the systematic rank of families is allotted to these groups, and they are both, together with several other heterogeneous families, comprised within the 2nd tribe of this suborder *Podoplea*, to which the name *Ampharthrandria* is given. I have otherwise shown, that the principles upon which Giesbrechts classification is founded do not at all hold good in every case, and this is also proved in regard to the *Copepoda* here in question. It may be that the name *Ampharthrandria* is applicable to the *Monstrilloida*; but this is by no means the case with the *Notodelphyoida*, this group comprising many forms with the anterior antennæ quite alike in the 2 sexes. Moreover, the genus *Thaumatopsyllus* among the *Monstrilloida* differs conspicuously even in the principal character by which the 2 suborders *Gymnoplea* and *Podoplea* are distinguished by Giesbrecht, viz., the mutual relation between the anterior and posterior divisions of the body. The many essential characters distinguishing the 2 groups here treated of, both from each other and from the other known *Copepoda*, have led me to the conclusion, that they ought to be raised to the rank of distinct divisions, to be again subdivided into real families. The relation of these divisions to other known groups of *Copepoda* is somewhat obscure, though in some instances a tendency towards the Cyclopoid type is unmistakable. On the other hand, by an extreme degradation of the whole body and its appendages, some forms belonging to the *Notodelphyoida* acquire an appearance, strongly recalling that of the *Lernæoida*. All the forms here in question are in some measure parasitic in habits. But the parasitism is of a very different kind in the



2 divisions. The *Monstrilloida* are, according to the interesting observations of Malaquin, in their juvenile state true endoparasites, living as simple, sac-like bodies in the blood-vessels of some invertebrate animals (Annelids), whereas in the adult state they are freely living pelagic animals provided with powerfully developed natatory appendages. The *Notodelphyoida*, on the other hand, are for whole their life confined to their hosts (simple and compound Accidians), all stages of growth being mostly found together in the branchial cavity of these Tunicata. Yet they do not seem, as a rule, to feed on the juices of their hosts, but more properly on the nourishing particles and small organisms introduced, together with the constantly renewed water, in the branchial cavity by the breathing process. Of course they cannot at all be regarded as true parasites, but more properly as commensals or messmates. Both divisions here treated of are well represented in the Fauna of Norway, and as there is some confusion in regard to the exact definition of the genera and species, and moreover the descriptions and figures given by earlier authors in many cases are very incomplete and partly erroneous, I think that a thorough revision of these 2 interesting groups, accompanied by good figures, cannot fail to be of interest.

## MONSTRILLOIDA.

*Remarks.*—The most prominent morphological character distinguishing this group of Copepoda, is the total absence, in the adult state, of both the posterior antennæ and of any traces of oral appendages, as also of a functional alimentary canal. Of course the fully developed animal is quite incapable to feed in the ordinary manner, but may only subsist on the nourishing matter accumulated within the body-cavity during its juvenile parasitic existence, the adult stage being exclusively devoted to the propagation. The division *Monstrilloida* comprises as yet only a rather restricted number of forms, which all formerly were referred to a single genus, viz., *Monstrilla* of Dana, with which the genus *Thaumaleus* of Krøyer was considered to be identical. In recent times, it is true, a subdivision of the genus *Monstrilla* into 2 or 3 genera has been attempted, but these genera are so closely allied, that they at all events must be comprised within the same family. Yet an interesting new genus (*Thaumatopsyllus*), apparently referable to the *Monstrilloida*, has recently been added by the present author, and this genus is so very different from the other Monstrilloid genera, that it cannot by any means be included in the same family with them, but must be regarded as the type not only of a separate family, but even of a distinct section, for which I have proposed the name *Monstrilloida cyclopimorpha*. Of course the division Monstrilloida appears at present cleft into 2 well defined sections, the *M. cyclopimorpha* and the *M. genuina*; but each of these sections is as yet only represented by a single family.

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## Section 1.

### Monstrilloida cyclopimorpha

*Remarks.*—The type of this section is the remarkable form described by the present author in another place under the name of *Thaumatopsyllus paradoxus*. The reception of this form within the division *Monstrilloida* appears to be warranted by the above-mentioned general morphological character: the total absence of both the posterior antennæ and of any oral appendages. Otherwise this form differs considerably from the Monstrilloid type.

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### Fam. Thaumatopsyllidæ.

*Remarks.*—As this family at present only comprises a single genus, it may be sufficient to give the characters of that genus.

### Gen. *Thaumatopsyllus*, G. O. Sars, 1913.

*Generic Characters.*—Body of adult female cyclopoid in shape, the anterior division being conspicuously dilated, the posterior slender and attenuated. Head consolidated with the 1st trunkal segment, and having the front produced below to a short and blunt rostral prominence. The 2 succeeding trunk-segments normally developed, the 2 posterior ones, however, abruptly much narrower and firmly connected with the tail, to form with it the posterior movable portion of the body, Tail proper composed in female of only 3 segments, the last extremely slender and narrow, rod-like. Caudal rami well



developed, with the normal number of setæ. Anterior antennæ composed of a limited number of well defined joints, and extended laterally. No traces of posterior antennæ and oral appendages observable, nor of any distinct oral tubule. Three pairs only of natatory legs present, the 2 posterior pairs of legs being quite rudimentary and of similar structure. Two ovisacs present in female.

*Remarks.*—In the above diagnosis I have attempted to give the most essential characters, by which the present genus distinguishes itself from the other known Monstrilloida. The mutual relation of the 2 chief divisions of the body is very peculiar, and does not agree either with that mentioned by Giesbrecht as characteristic to his suborder *Gymnoplea* or with that characterising the *Podoplea*, the movable articulation between the 2 divisions occurring in quite a different place, viz., at the junction between the penultimate and antepenultimate trunk-segments. This is indeed a quite unique character distinguishing this genus from any other form known to me. As anomalous characters may also here be named the presence of only 3 pairs of natatory legs, and the narrow rod-like shape of the last caudal segment. The genus comprises as yet only a single species, to be described below.

# 1. *Thaumatopsyllus paradoxus*, G. O. Sars.

(Pl. I.)

*Thaumatopsyllus paradoxus*, G. O. Sars, Arch. f. Mathem. og Naturvidenskab. Bd. XXXIII, No. 6, p. 5, w. plate.

*Specific Characters.*—*Female.* Body comparatively slender, with the anterior division somewhat depressed and oblong oval in outline. Cephalic segment very large and slightly contracted anteriorly, frontal part narrowly rounded. The 2 succeeding segments well developed, with the lateral parts closely contiguous and rounded behind. Penultimate trunk-segment scarcely more than half as broad as the preceding one; last segment still smaller. Tail exceedingly slender, almost attaining half the length of the body; genital segment slightly constricted in the middle; 2nd segment quite short and having the posterior edge somewhat produced dorsally; 3rd segment more than twice as long as the other 2 combined, and extremely narrow, rod-like, with the slightly dilated extremity transversely truncated. Caudal rami but slightly diverging and oblong quadrangular in form, being about 4 times as long as they are broad, and a little widening distally; seta of outer edge occurring about in the middle; apical setæ of moderate size and densely ciliated, the outermost one shorter than the other 3. Antennæ not nearly attaining the length of the cephalic

segment, and each composed of 9 joints clothed with scattered simple setæ; 3rd joint much the largest, the 6 outermost joints comparatively short and equal-sized. The 3 pairs of natatory legs normally developed and of essential same structure, with both rami 3-articulate and nearly of equal size. The last 2 pairs of legs very unlike the former, and reduced to simple small 3-articulate stems, with the middle joint very small, last rounded in shape and provided with 2 unequal apical spines. Ovisacs very large, rounded oval in form.

Body in the living animal highly transparent and nearly colourless, its anterior part being filled up with a number of clear oil-bubbles of unequal size and partly of a light orange colour. Eye replaced by a comparatively large transverse patch of a light red pigment, in which, however, no trace of refracting elements could be detected.

Length of adult female 1.65 mm.

*Male* unknown.

*Remarks.*—The above-described form is easily recognisable from any of the other known Copepoda, both as regards its outward appearance and the structure of the several appendages. I am much inclined to believe, that its life-history will turn out to be a similar one to that stated by Malaquin for the *Monstrillidæ*, and that in the juvenile state this form leads a true parasitic existence within the body of some invertebrate animals.

*Occurrence.*—Three specimens only of this remarkable form, all of the female sex, have as yet come under my notice. One of them was taken, many years ago, in the Christiania Fjord, at Drøbak, the other 2 in the Trondhjem Fjord, at Selven. All 3 specimens were captured, together with other pelagic animals, by the aid of a plankton-net lowered to a depth of about 60 fathoms. The living animal was seen moving through the water in a similar jumping manner to that observed in most Cyclopoida. It was, however, by no means particularly agile in its movements.

## Section 2.

### Monstrilloida genuina.

*Remarks.*—In this section are comprised the typical Monstrilloida, the general characters of which coincide with those given below for the sole family as yet representing the section.

### Fam. Monstrillidæ.

*General Characters.*—Body more or less slender and elongated, with the anterior division only slightly dilated and not sharply marked off from the posterior. Head and 1st trunkal segment completely coalesced, forming together a very large segment of a more or less cylindrical shape, and as a rule occupying rather more than half the body, its anterior extremity obtusely truncated, without any rostral prominence; ventral face of the segment in the greater extent of its length quite smooth, exhibiting no traces of either posterior antennæ or any oral appendages, being only provided in the median line with a small tubular process, from which a short canal leads to the inner substance of the body; the latter in female specimens retracted from the walls of the segment in a most peculiar manner, so as to form a rather narrow band-like chord passing through the axis of the segment. Exposed part of trunk composed of 4 well defined segments gradually diminishing in size behind. Tail poorly developed, with the number of segments more or less reduced, and exhibiting well marked sexual differences. Caudal rami, as a rule, short, but provided with strong plumose setæ, the number of which is somewhat variable in the



different genera. Eye, when present, exhibiting 3 highly refracting lenses, one ventral and 2 lateral, imbedded in a dark pigment. Anterior antennæ, unlike what is generally the case in Copepoda, extended straight forwards, and composed of a limited number of joints clothed with rather unequal setæ pointing in different directions, some of them being much elongated and finely ciliated, some others, attached to the terminal joint, exhibiting not seldom a peculiar dichotomous ramification; same antennæ in male distinctly hinged. Natatory legs present in the usual number, and very powerfully developed, with the basal part large and muscular and both rami 3-articulate. Last pair of legs in female represented on each side by a single more or less lamellar joint carrying a restricted number of plumose setæ; in male much reduced, or wholly absent. Alimentary canal quite obliterated. Ovaria, when fully developed, very massive, filling up the greater part of the body-cavity and extending anteriorly within the frontal part of the head; the ripe ova not included in any true ovisacs, but agglutinated to 2 slender juxtaposed spines or filaments issuing from the ventral face of the genital segment, these spines being in male replaced by a thickish, somewhat clavate appendage, into which the spermatophores are received before extrusion.

*Remarks.*—Of this family at first only 2 species were known, derived from 2 widely remote localities, the one recorded by Dana from the Sulu Sea as *Monstrilla viridis*, the other by Krøyer from the Norwegian coast as *Thaumaleus typicus*. These 2 species, though bearing very different names, are evidently nearly allied, and were also by most subsequent authors regarded as congeneric. In more recent times a considerable number of additional forms of the same remarkable type have been recorded from different parts of the oceans, and it appeared desirable to group these species according to some more conspicuous diversities found between them. Thereby the first step to a subdivision of the genus *Monstrilla* was intimated. Such a subdivision was indeed carried out in the year 1892 by Giesbrecht, who referred the Monstrillidæ at that time known to 2 nearly-allied genera, chiefly characterised by the segmentation of the tail and by the number of the caudal setæ. For the one of these genera he retained the old name *Monstrilla*, for the other he applied the name *Thaumaleus* proposed by Krøyer, and this arrangement has now generally been admitted by carcinologists. I am also of opinion that these 2 genera should be supported; but I am by no means prepared to consent with Giesbrecht in his application of the name *Thaumaleus* to the one of these genera. For it is quite certain, that the form recorded by Krøyer is not referable to Giesbrecht's genus, differing as it does,

just in one of the 2 principal characters by which that genus is distinguished from *Monstrilla*, viz., in the number of caudal setæ. Both according to the description given by Krøyer in "Naturhistorisk Tidsskrift" and to the figures in the Atlas to Gaimards voyage, the caudal rami in Krøyers species are each provided with 5 well-developed setæ, as in most species of the genus *Monstrilla*, whereas in Giesbrecht's genus the number of setæ is much reduced, only 3 such setæ occurring on each ramus (at last in female). In any case, if it should be found advisable to support the genus *Thaumaleus* of Krøyer, it must be confined to the species recorded by that author. Fortunately we have another generic name to replace that given by Giesbrecht to his genus, viz., *Cymbasoma*, proposed as early as the year 1888 by I. C. Thompson for a species (rigidum), which evidently is referable to Giesbrecht's genus. The genus *Hæmocera* of Malaquin I regard as synonymous with that genus. In addition to the 2 genera *Monstrilla* and *Cymbasoma*, I have found it advisable to establish another genus, *Monstrillopsis*, to include the anomalous species described by Scott under the name of *Monstrilla dubia*. The family Monstrillidæ thus at present comprises 3 genera, all of which are represented in the fauna of Norway.

Though I have not myself as yet had any opportunity to study the peculiar life-history of the Monstrillidæ, I think that a short resumé of the interesting investigations made in this respect by the French naturalist Malaquin<sup>1)</sup> may here be given. According to that distinguished author, the young live the eggs as small Nauplii, without mouth or alimentary canal, but provided in front with the usual 2 pairs of limbs (anterior and posterior antennæ) and behind them on each side with a hook-like appendage (mandibles). The Nauplii soon attach themselves to some polychæte Annelid and penetrate through the body-wall of the same, then entering the vascular system. By this process they lose completely all their appendages, and become converted to simple ovoid bodies merely consisting of an assemblage of indifferent embryonic cells surrounded by a thin cuticle. From the one end of these bodies 2 soft horn-like processes grow out, gradually increasing in length, and at last assuming the form of slender thread-like appendages. It is supposed that through these appendages the absorption of the blood-serum of the host is performed, and according to their position they may answer to the posterior antennæ. During the rapid growth of these endo-parasitic larvæ a remarkable differentiation takes place in their interior, resulting in the formation of the characteristic and rather

<sup>1)</sup>. See: Arch. Zool. Exp. (3), Vol. 9, 1901.

complicated body of a true Monstrillid. In the last larval stage the enclosed Monstrillid is very distinctly traced through the thin outer cuticle of the larva, filling up nearly the whole inner cavity, and exhibiting all the definitive appendages, as also distinct traces of the generative organs, at least the female ones. At this time the larva is ready to force its way out of the body of the host, and this is apparently accomplished by a burrowing action of the hind acutely produced extremity, which is surrounded with several rows of small hooklike spinules. After the escape of the larva its thin outer cuticle soon burst, and the enclosed Monstrillid is thus allowed to emerge, unfolding its several appendages. Its movements are at first rather slow, but very soon, by a single moult, it acquires its full development, moving quickly about, to commence its free pelagic existence.

## Gen. 2. *Monstrilla*, Dana, 1848.

Syn: ? *Thaumaleus*, Kröyer (not Giesbrecht).

*Generic Characters*.—Body as a rule very slender and elongated, especially in female, with the cephalic segment in most cases occupying rather more than half its length and more or less cylindrical in shape; exposed part of trunk gradually narrowed behind, with the lateral parts of the segments rounded off. Tail composed in female of 3, in male of 4 well defined segments, the last one rather small and obtusely truncated behind.\* Caudal rami sublamellar, each provided in female with 5 or 6 setæ, one of which is generally shorter than the others and attached more dorsally; those in male of same appearance as in female, but lacking one of the setæ. Eye in most of the species imperfectly developed. Oral tubule generally far remote from the frontal part of the head. Antennæ more or less elongated, with the joints generally imperfectly defined in female. Natatory legs with the basal part very massiv, rami comparatively short, both clothed inside and at the end with long plumose setæ; outer ramus somewhat longer than the inner and only provided with 2 small spines outside, the one attached to the 1st joint, the other to the end of the last joint. Last pair of legs in female sublamellar and somewhat extended laterally, inner edge more or less expanded, extremity slightly exserted and provided with 3 (in some cases only 2) plumose setæ; those in male much reduced in size, knob-like, and tipped with one or two slender setæ.

*Remarks*.—The present genus was established as early as in the year 1848 by Dana, and may be regarded as the type not only of the family Monstrillidæ, but also of the whole division here treated of. It is chiefly distin-



guished from the other 2 genera comprised within the present family by the more complete segmentation of the tail and the increased number of caudal setæ. Another character by which the species of this genus may be readily recognised, is the position of the oral tubule, which is more or less far remote from the frontal part of the head, whereas in the other 2 genera it generally occurs in close approximation to that part.

Seven Norwegian species referable to this genus will be described in the sequel, one of them being, however, somewhat doubtful and only observed in the male sex.

## 2. *Monstrilla longicornis*, Thompson.

(Pl. II & III).

*Monstrilla longicornis*, I. C. Thompson, Trans. Biol. Soc. Liverpool, Vol IV, p. 119, Pl. IV, figs. 1, 2, 4 (♂).

Syn: *Monstrilla intermedia*, Aurivillius.

*Specific Characters.*—*Female.* Body moderately slender, with rather coarse integuments, which exhibit everywhere a finely granular or dotted surface. Cephalic segment occupying about half the length of the body, and almost of equal width throughout, though, seen dorsally, exhibiting somewhat behind the middle a slight but easily observable dilatation, frontal part bluntly truncated. Tail about equalling half the length of the exposed part of the trunk; genital segment comparatively large, being fully as long as the remaining part of the tail, and oblong quadrangular in shape, with a well marked transverse suture in the middle of the dorsal face; ovigerous spines about twice the length of the tail. Caudal rami about equalling in length the last 2 segments combined, and only slightly divergent, each provided with 5 strong plumose setæ of nearly equal size, the outermost one attached to a well-marked ledge of the outer edge, the others to the somewhat obliquely rounded apex. Eye imperfectly developed, without any trace of refracting elements, and only replaced by a diffuse yellowish pigment. Antennæ rather slender and elongated, though scarcely exceeding in length the cephalic segment, and each apparently composed of 5 joints, of which, however, only the 1st is distinctly defined, the others being confluent and only indicated by slight constrictions of the antenna; most of the setæ attached around the middle of the fusiform terminal joint reachably ramified. Oral tubule well marked and occurring somewhat behind the middle of the cephalic segment. Natatory legs all of the very same structure and also of about equal size; 2nd basal segment not very sharply defined from the 1st, and armed inside with 2 small juxtaposed denticles; terminal joint of outer

ramus rather produced, being fully twice as long as the middle one, and having the outer edge divided into 4 very distinctly marked crenulations. Last pair of legs rather broad at the base, but having the outer part abruptly narrowed and provided at the obtusely rounded extremity with 3 ciliated setæ, the innermost of which is much smaller than the other 2; inner expansion almost rectangular and carrying a single, but well developed seta.

*Male* considerably smaller than female and of somewhat shorter and stouter form of the body, but exhibiting a very similar shape of the cephalic segment. Tail comparatively more slender than in female, and composed of 4 well defined segments of nearly equal length, the 1st, as usual, produced below to a club-like copulative appendage terminating in 2 short diverging rami, each armed at the end with a short spine. Caudal rami of a similar shape to that in female, but with one of the apical setæ absent. Antennæ more strongly built than in female and having the joints more distinctly defined, being moreover conspicuously hinged, the hinge occurring between the last 2 joints. Natatory legs of exactly same structure as in female. Last pair of legs, however, much reduced in size, forming 2 small knob-like prominences issuing from a common base, each prominence tipped by 2 (in some cases only 1) slender setæ.

Body in both sexes of a yellowish grey colour, and on the whole less transparent than in most other species.

Length of adult female 3.50 mm., of male 2.30 mm.

*Remarks.*—This species was established in the year 1890 by J. C. Thompson, and was only based on a solitary male specimen taken by him off the Puffin Islands. Subsequently, however, Th. Scott recorded this form from many other localities, and has given in the report of the Fishery Board for Scotland (1904) good descriptions and figures of both sexes. He is of opinion that Giesbrecht's species, *M. longiremis*, is identical with that observed by him; but this is certainly not the case, as will be shown further on. The present species may be easily distinguished from its nearest allies by the somewhat robust body and the rather coarse and distinctly granular integuments. Two other characters, both derived from the structure of the natatory legs, may also here be named, viz., the presence inside the 2nd basal segment of 2 well defined denticles, and the very conspicuous crenulation of the outer edge on the terminal joint of the outer ramus. These characters are pretty constant and found quite alike in both sexes. The form recorded by Aurivillius under the name of *M. intermedia* is identical with the present species.

*Occurrence.*—I have met with this form occasionally in several places, both on the south and west coast of Norway, among other pelagic animals



taken by the aid of the tow-net near the surface of the sea. The movements of the animal are very rapid, and are performed in abrupt bounds, whereby the body is kept in a more or less erect position. Male specimens seem to occur in nearly same number as the females.

*Distribution.* British Isles (Thompson, Scott), Skagerak (Aurivillius).

### 3. *Monstrilla longiremis*, Giesbrecht.

(Pl. IV & V)

*Monstrilla longiremis*, Giesbrecht, Pelagische Copepoden des Golfes von Neapel, p. 589, Pl. 46, figs. 10, 14, 22, 37, 41.

*Specific Characters.—Female.* Body considerably more slender than in the preceding species, with thinner and scarcely at all granular integuments. Cephalic segment occupying rather more than half the length of the body, and slightly narrowed in its anterior part, with no distinct dilatation in the middle. Tail agreeing with that in *M. longicornis*, as regards its relative size and its segmentation, but having the ovigerous spines considerably more elongate. Caudal rami comparatively narrower than in that species and remarkably divergent; number of marginal setæ, as in *M. longicornis*, 5 on each ramus, the innermost but one conspicuously shorter than the others. Eye inconspicuous. Antennæ exceedingly slender and elongated, considerably exceeding in length the cephalic segment, and, as in the preceding species, having all the joints, except the 1st, confluent. Oral tubule rather small, and occurring about in the middle of the cephalic segment. Natatory legs resembling in structure those in *M. longicornis*, but differing in the presence of only a single denticle inside the 2nd basal segment, and in the total absence of any crenulations on the outer edge of the terminal joint of the outer ramus. Last pair of legs comparatively narrower, with the inner expansion less prominent and evenly rounded off; number of marginal setæ as in *M. longicornis*. Ova attached to the genital spines very numerous, and in some cases accumulated to form an oblong oval mass extending far beyond the limits of the body.

*Male* of rather small size, as compared with the female, but exhibiting a much similar slender and narrow form of the body. Cephalic segment nearly perfectly cylindrical in shape and exceeding somewhat in length the remaining part of the body. Tail, as in the male of *M. longicornis*, distinctly 4-articulate, with the copulative appendage of a very similar structure. Caudal rami agreeing in shape with those in female and spread out in the same remarkable manner, each of them, however, only provided with 4 setæ. Antennæ much more slender than in the male of *M. longicornis*, with the 2nd joint of

unusual length, otherwise built in a much similar manner. Natatory legs exactly as in female. Last pair of legs, however, very small, knob-like, each only tipped with a single slender seta.

Body in both sexes rather pellucid with only a very slight yellow tinge, and provided in some places with a few small pigmentary patches of a darker colour.

Length of adult female generally about 3 mm., though in some instances reaching 3.70 mm.; that of male scarcely attaining 2 mm.

*Remarks.*—The above-described form is unquestionably the same as that recorded by Giesbrecht from the Mediterranean, the identity of both being at once seen by a comparison of the figures here given with those in Giesbrecht's work. It is true that the present form in several respects shows a near relationship to *M. longicornis*; but I think that the above given descriptions of these 2 forms will prove them to be in reality specifically distinct.

*Occurrence.*—Several specimens of this form have been taken by me at different times and in different places on the Norwegian coast, from the Christiania Fjord and northwards to Kvalø. Only a single male has, however, as yet come under my notice, all the other specimens were of the female sex.

*Distribution.*—Mediterranean (Giesbrecht).

#### 4. *Monstrilla clavata*, G. O. Sars, n. sp.

(Pl. VI)

*Specific Characters.*—*Female.* Body rather stout and clumsy, being considerably dilated in its anterior part and viewed laterally, of a pronouncedly clavate shape. Cephalic segment very large, occupying rather more than half the length of the body, and having its greatest width about in the middle, dorsal face remarkably vaulted in front. Tail about half the length of the exposed part of the trunk, and on the whole resembling in structure that in the 2 preceding species; ovigerous spines rather produced, being fully 3 times as long as the tail. Caudal rami exceeding somewhat in length the last 2 segments combined, and only slightly divergent, each, as in the 2 preceding species, provided with 5 setæ, the innermost but one being, however, considerably shorter than the others. Eye inconspicuous. Antennæ not nearly attaining the length of the cephalic segment, otherwise built in much the same manner as in the 2 preceding species. Oral tubule rather prominent and occurring somewhat behind the middle of the cephalic segment. Natatory legs, as in *M. longiremis*, armed inside the 2nd basal segment with a single well-marked denticle, terminal joint of outer ramus with a slight indication of a crenulation

of the outer edge. Last pair of legs very similar in shape to those in *M. longicornis*, the inner expansion being rather prominent.

Body in the living animal whitish pellucid, and ornamented with irregular patches of a light reddish brown or chestnut-coloured pigment.

Length of adult female 4.50 mm.

*Male* unknown.

*Remarks.*—This is much the largest of the species observed by me, and I therefore at first believed it to be the *M. grandis* of Giesbrecht. On a closer examination I have, however, found it to differ in some respects very essentially from that species, being in reality much more nearly related to the 2 preceding species, though easily distinguishable from them by the rather different shape of the body.

*Occurrence.*—A solitary female specimen of this form was taken, many years ago, at Hvalør, outside the Christiania Fjord.

## 5. *Monstrilla leucopis*, G. O. Sars, n. sp.

(Pl. VII)

*Specific Characters.*—*Female.* Body exceedingly slender and elongated, resembling somewhat in shape that of *M. longiremis*. Cephalic segment considerably exceeding half the length of the body, and of a narrow cylindrical form. Tail comparatively short, scarcely attaining half the length of the exposed part of the trunk; genital segment rather dilated at the base, and without any trace of a dorsal suture; ovigerous spines of moderate length. Caudal rami rather large, exceeding in length the last 2 segments combined, and only slightly divergent, inner edge perfectly straight, outer considerably protuberant in front of the middle; each ramus provided with 5 setæ, 3 of which issue from the narrowly rounded apex, the other 2 from the outer edge, the latter of very unequal size, the proximal one being normally developed, whereas the distal one is greatly reduced, and only slightly exceeds in length the corresponding ramus. Eye inconspicuous, and replaced by an opaque whitish substance apparently answering to the ocular pigment. Antennæ rather slender, though not nearly attaining the length of the cephalic segment, and having their 5 joints more distinctly defined than in the preceding species, none of the setæ attached to the terminal joint ramified. Oral tubule rather small, and occurring somewhat in front of the middle of the cephalic segment. Natatory legs without any denticle inside the 2nd basal segment, outer ramus rather produced and having the outer edge of the terminal joint perfectly



smooth. Last pair of legs gradually narrowed distally, and only provided with 2 apical setæ, inner edge scarcely expanded.

*Male* much smaller than female, but exhibiting a very similar slender form of the body. Tail, as usual, composed of 4 well defined segments, the 1st of which is the largest, and is produced below to a rather large and prominent copulative appendage of an oblong oval form and armed on each side with a straight rod-like spine. Caudal rami of the very same shape as in the female, and having the outermost but one of the setæ reduced in a similar manner, differing, however, as in the males of the preceding species, in the absence of one of the apical setæ. Anterior antennæ hinged in the usual manner. Last pair of legs reduced to 2 very small knob-like prominences, each tipped with a single slender seta.

Body (in female) highly transparent and ornamented in some places with pigmentary patches of a light reddish colour. Length of adult female reaching to 3.30 mm.; that of male scarcely exceeding 1.60 mm.

*Remarks.*—I have been in some doubt, if not the above-described form should be the same as that recorded by Scott under the name of *M. anglica* Lubbock. Indeed, in the structure of the last pair of legs and the peculiar reduction of the outermost but one of the caudal setæ, both these forms seem to agree pretty well. On the other hand, is the general shape of the body, to judge from the figure given by Scott, rather unlike, and another very essential difference is found as regards the number of the caudal setæ, which, both according to the description and the figure given by Scott, is stated to be 6 on each ramus in the form observed by him. In any case the specific name *anglica* cannot be applied either to the present form, or to that observed by Scott, as it seems evident that Lubbock's species is different from both of them. I have retained for the species here treated of the name assigned to it long ago in my notes.

*Occurrence.*—Some few specimens of this form, among them a single male, were collected, many years ago, at Kvalø on the Nordland coast.

## 6. *Monstrilla gracilicauda*, Giesbrecht.

(Pl. VIII)

*Monstrilla gracilicauda*, Giesbrecht. Pelagische Copepoden des Golfes von Neapel, p. 587, Pl. 46, figs. 9, 16, 18, 29, 32, 43.

*Specific Characters.*—*Female.* Body moderately slender, with the anterior division slightly dilated in the middle. Cephalic segment about occupying half

the length of the body, and, viewed dorsally, exhibiting a very slight dilatation in front of the middle, frontal edge somewhat produced between the insertion of the antennæ. Tail exceeding half the length of the exposed part of the trunk; genital segment rather large, being considerably longer than the remaining part of the tail, and gradually narrowed behind, dorsal face with a very slight transverse suture in the middle; ovigerous spines unusually short. Caudal rami comparatively small and somewhat divergent, each provided with 6 setæ, one of which, however, is very short and attached somewhat dorsally. Eye easily observable in the living animal, though of a somewhat incomplete structure, lateral lenses small and rather remote from each other, being connected by a narrow stripe of dark pigment, ventral lens apparently imperfectly developed. Antennæ rather shorter than in the species described in the preceding pages, not even attaining half the length of the cephalic segment, and only composed of 4 joints, the last of which is about as long as the other 3 combined and somewhat fusiform in shape, with none of the setæ ramified. Oral tubule occurring unusually far in front, at about the end of the first  $\frac{1}{3}$  of the cephalic segment. Natatory legs without any denticle inside the 2nd basal segment, outer ramus considerably longer than the inner and having the terminal joint well developed, with the outer edge perfectly smooth. Last pair of legs somewhat clavate in outline, the inner edge forming a rounded expansion immediately inside the extremity, apical setæ 3 in number and of nearly equal size.

Body in the living animal rather transparent and in some places tinged with a light yellow pigment.

Length of adult female reaching to 3.55 mm.

*Male* unknown.

*Remarks.*—The present species is easily distinguished from those described in the preceding pages by the comparatively shorter antennæ, the position of the oral tubule, and the shape of the last pair of legs. The tail, moreover, appears more elongate and the genital segment of larger size than in those species.

*Occurrence.*—Some few specimens of this form, all of the female sex, were collected, many years ago, in 2 different places on the Nordland coast, viz., Valdresund and Kvalø.

*Distribution.*—Mediterranean (Giesbrecht) Scottish coast (Scott).

7. *Monstrilla helgolandica*, Claus.

(Pl. IX)

*Monstrilla helgolandica*, Claus. Die freilebenden Copepoden, p. 165, Pl. 12, fig. 9.

*Specific Characters.*—*Female.* Body comparatively short and stout, and somewhat dilated in its anterior part. Cephalic segment about occupying half the length of the body and, viewed dorsally, exhibiting a somewhat fusiform shape, with the greatest width a little in front of the middle and almost attaining half the length. Tail of a similar shape to that in *M. gracilicauda*, the genital segment being rather large and gradually narrowed behind; ovigerous spines of moderate length. Caudal rami considerably divergent, and narrow oblong in shape, each provided with 6 setæ of somewhat unequal length, one of them, attached somewhat dorsally, being very small, that next to it on the outer side somewhat shorter than the 4 remaining ones, all the setæ issuing from the outermost rounded part of the ramus. Eye easily observable, and having all 3 lenses distinctly developed. Antennæ scarcely attaining half the length of the cephalic segment, and, as in *M. gracilicauda*, only composed of 4 joints. Oral tubule well marked, and occurring about in the middle of the cephalic segment. Natatory legs without any denticle inside the 2nd basal segment, outer ramus less elongate than in the other species, with the terminal joint of smaller size. Last pair of legs rather unlike those in the other known species, each forming a narrow cylindrical stem, angularly bent in the middle and tipped with 2 subequal setæ.

Body very transparent in its anterior part, but behind tinged with a dark brownish pigment.

Length of adult female scarcely exceeding 1.40 mm.

*Male* unknown.

*Remarks.*—This is a very small-sized species, and may moreover be easily recognised by the unusual short and stout form of the body, as also by the structure of the caudal rami and that of the last pair of legs. The form recorded by Bourne as *M. helgolandica* is quite certainly not that species, but more properly referable to *M. longiremis* Giesbrecht.

*Occurrence.*—Two female specimens only of this form have as yet come under my notice. They were taken, many years ago, at Christiansund, west coast of Norway.

*Distribution.*—Helgoland (Claus), Skagerak (Timm).



8. *Monstrilla serricornis*, G. O. Sars, n. sp.

(Pl. X, fig. 1).

*Specific Characters.*—*Male.* Body comparatively short and stout, and, seen laterally exhibiting a somewhat clavate shape. Cephalic segment shorter than usual, only slightly exceeding in length the exposed part of the trunk and, seen dorsally, nearly of equal width throughout, its ventral face forming anteriorly a rather prominent gibbous convexity, but without any distinctly marked oral tubule. Tail rather narrow, and composed of 4 well defined segments, the 1st of which is produced below to a sub-clavate copulative appendage provided at the end on each side with a short auriculiform lobe. Caudal rami comparatively small and somewhat divergent, each having the form of a rounded oval lamella edged with 5 subequal setæ. Eye inconspicuous. Antennæ about equalling in length  $\frac{2}{3}$  of the cephalic segment, and rather strongly built, being composed of 5 well defined joints, the last of which is, as usual, very movably articulated to the preceding one, and somewhat knife-shaped, with the inner sharpened edge divided at the extremity into 5 small recurved denticles. Natatory legs of the usual structure. 5th pair of legs wholly absent.

Colour not yet ascertained. Length of the body 1.75 mm.

*Female* unknown

*Remarks.*—It is only provisionally that I refer the above-described remarkable form to the genus *Monstrilla*, from which it in some respects seems to differ rather conspicuously. As, however, only the one sex as yet has been observed, its true relationship cannot at present be fully made out. The peculiar armature of the antennæ may suffice to distinguish at once this form from any of the hitherto known *Monstrillidæ*.

*Occurrence.*—Two specimens only of the present form have as yet come under my notice, both of the male sex and exactly agreeing with each other. The one was taken at Bukken, outside the Stavanger Fjord, the other at Kvalø, on the Nordland coast.

Gen. 3. *Cymbasoma*, Thompson, 1888.

Syn: *Thamaleus*, Giesbrecht (not Krøyer).

• *Hæmocera*, Malaquin.

*Generic Characters.*—General form of the body resembling that in *Monstrilla*. Tail however having the number of segments reduced in both sexes, only 2 segments being present in female and 3 in male. Caudal rami com-

paratively short and more or less pronouncedly club-shaped, each ramus provided in female with only 3 distinctly developed setæ, whereas in male, contrary to what is the case in *Monstrilla*, their number is generally increased by one additional seta. Eye as a rule well developed. Antennæ rather short in female and only composed of 4 joints, in male much more elongate, and distinctly 5-articulate, with a well-marked hinge between the last 2 joints. Oral tubule generally occurring far in front, in close approximation to the frontal part of the head. Natatory legs built in the usual manner. Last pair of legs in female comparatively short, but provided inside with a well defined lobe; in male wholly absent.

*Remarks.*—This genus was proposed in the year 1888 by J. C. Thompson, to include a peculiar Copepod (*C. rigidum*), of which at first only a single female specimen was found. As, on a closer examination of several other specimens taken by the same author partly in the Mediterranean, partly on the British coast, the near relationship of this form to the species at that time referred to the genus *Monstrilla* of Dana was recognised, the generic name *Cymbasoma* was subsequently withdrawn in favour of that of *Monstrilla*. By the subdivision of the latter genus into 2 nearly-allied genera carried out by Giesbrecht, it was, however, of course required to decide to which of these 2 genera the species of Thompson should be referred, and in this regard no doubt can arise. It is quite certainly a true member of the genus to which Giesbrecht had applied the name *Thaumaleus*. Since, however, as stated above, the application of this name to the present genus is quite inadmissibel, I have felt justified to restore the generic name proposed by Thompson.

The genus here treated of is chiefly distinguished from *Monstrilla* by the reduced number of segments in the tail, and, by the likewise reduced number of caudal setæ. Moreover the position of the oral tubule and the total absence in the male of the 5th pair of legs may be named as characters distinguishing the present genus. Three well defined species with be described in the succeeding pages.



9. *Cymbasoma rigidum*, Thompson.

(Pl. X, fig. 2, Pl. XI).

*Cymbasoma rigida*, J. C. Thompson, Linn. Soc. Journ. Zool., Vol., XX, p. 154, Pl. XIII, figs. 1—4.

- Syn: *Monstrilla rigida*, Bourne.  
 " *Thaumaleus rigidus*, Scott.  
 " *Thaumaleus Claparèdi*, Giesbrecht.  
 " *Thaumaleus germanicus*, Timm.  
 " *Hæmocera Danaë*, Malaquin.

*Specific Characters.—Female.* Body moderately slender, and generally extended in a manner to give it a somewhat rigid appearance. Cephalic segment fully as long as the remaining part of the body and, viewed dorsally, somewhat dilated in the middle, ventral face evenly convex throughout. Tail scarcely exceeding half the length of the exposed part of the trunk; genital segment of moderate size and evenly narrowed behind, ovigerous spines nearly 3 times as long as the tail; distal segment somewhat flattened and gradually widening behind, exhibiting in front of the middle, on each side, a slight notch, as an attempt to a subdivision, the notch not being, however, continued in any defining suture. Caudal rami only slightly longer than they are broad, and not much divergent, with the inner edge somewhat concaved, the outer gibbously produced, each ramus provided with 3 strong subequal setæ, the outermost of which is attached to a rather prominent ledge; a very small appendicular bristle is moreover generally found attached near the inner corner to the ventral face. Eye well developed, with all 3 lenses distinct. Antennæ rather short, scarcely attaining  $\frac{1}{3}$  of the length of the cephalic segment, terminal joint somewhat shorter than the other 3 combined, with none of the setæ ramified. Oral tubule rather small, and occurring at about the end of the first  $\frac{1}{4}$  of the cephalic segment. Natatory legs with the outer ramus only slightly longer than the inner, its terminal joint not much produced. Last pair of legs with 3 apical setæ, the innermost of which is much smaller than the other 2, inner edge produced to a narrow linguiform lobe curving outwards along the terminal part of the leg, and in most cases extending as far as the latter. Ova attached to the genital filaments very numerous and in some cases accumulated to form an elongate almost cylindrical mass extending far beyond the limits of the body.

*Male*, as usual, smaller than female and of a shorter and more robust form of the body, with the cephalic segment somewhat clavate in outline. Tail rather narrow and composed of 3 segments, the last exhibiting on each

side a quite similar notch to that observed in female; copulative appendage divided at the end into 2 comparatively large diverging lobes of a somewhat sausage-shaped form. Caudal rami more pronouncedly clavate than in female, each provided with 4 slender subequal setæ attached to the obtusely truncated and distinctly thickened extremity, one of them apparently answering to the small appendicular bristle found in the female. Antennæ much more elongate than in female and distinctly 5-articulate, last joint very movably articulated to the preceding one, and terminating in a slender, slightly curved spine. Natatory legs of exactly same structure as in female. Of a 5th pair of legs not the slightest trace is to be detected.

Body of female, as usual, very transparent in its anterior part, but otherwise exhibiting a light yellowish-grey colour, and tinged in some places with a darker brownish pigment.

Length of adult female reaching to 2.50 mm., of male to 1.75 mm.

*Remarks.*—That the present form is identical with that recorded by I. C. Thompson under the name of *Cymbasoma rigidum* and subsequently more fully described by Scott as *Thaumaleus rigidus*, appears to me to be beyond any doubt, and I am also of opinion, that several other forms, described under different names, should be referred to that species. Indeed, I have been unable to find any reliable character to distinguish the several forms enumerated above as synonymes, and I am thus led to the conclusion, that they all should be combined into the very same species, for which of course the earliest name ought to be retained.

*Occurrence.*—Several specimens of this form have been taken by me at different times and in different places, both on the south and west coast of Norway. Most of the specimens collected were of the female sex; but I have also come across a few male specimens, one of which has been subjected to a closer examination and is figured on Pl. X.

*Distribution.*—Atlantic Ocean off Teneriffe (Thompson). Mediterranean (Giesbrecht), coast of Normandie (Claparède), British Isles (Thompson, Scott), Eastern part of North Sea (Timm).

10. *Cymbasoma Thompsoni*, (Giesbrecht).

(Pl. XII)

*Thaumaleus Thompsoni*, Giesbrecht, Pelagische Copepoden des Golfes von Neapel, p. 584,  
Pl. 46, figs. 7, 27, 31, 36, 40.

*Syn. Monstrilla Danæ*, Moebius (non Claparède)

*Specific Characters.—Female.* Body comparatively more slender than in the preceding species, with the cephalic segment narrower and considerably exceeding in length the remaining part. Tail very short, scarcely longer than the last 2 trunkal segments combined; genital segment unusually tumid, seen dorsally almost circular in outline, ventral face strongly protuberant, ovigerous spines of moderate length; distal segment without any traces of lateral notches. Caudal rami rather small, each provided with 3 subequal setæ; no appendicular bristle present. Eye apparently well developed. Antennæ scarcely attaining  $\frac{1}{3}$  of the length of the cephalic segment, and of a structure very similar to that in the preceding species. Oral tubule somewhat more approximate to the frontal part of the head. Natatory legs with the outer ramus considerably longer than the inner, and the terminal joint more produced than in the preceding species. Last pair of legs resembling in structure those in *C. rigidum*, though having the innermost of the apical setæ rather smaller and the lobe of the inner edge less prominent.

*Male* comparatively more slender than that of the preceding species, and having the cephalic segment shorter and less pronouncedly clavate in shape. Tail composed of 3 well defined segments, the last of which, as in female, does not exhibit any traces of lateral notches. Caudal rami of the very same structure as in the female, each ramus being only provided with 3 setæ. Antennæ very strongly built, with the joints rather expanded, the last one very mobile and somewhat thickened at the extremity, which is armed with 2 small denticles. No traces of a 5th pair of legs present. Copulative appendage comparatively smaller than in the preceding species, with the terminal lobes less produced.

Colour of the living animal not yet ascertained.

Length of adult female 1.20 mm., of male 0.80 mm.

*Remarks.*—The present species was described by Giesbrecht from some specimens taken in the Baltic, east of Langeland, and sent to him from Moebius, who had previously recorded this form under the name of *Monstrilla Danæ*, Claparède. It may easily be distinguished from the preceding species by its much inferior size, and more particularly by the rather different shape



of the tail. The form described by Scott as *Thaumaleus Thompsoni* is quite certainly different from Giesbrecht's species.

*Occurrence*.—Three specimens only of this species, 2 females and 1 male, have as yet come under my notice. They were taken in as many different localities, viz., Christiansund, Skutesnæs and Risør.

*Distribution*.—Western part of the Baltic (Moebius).

# 11. *Cymbasoma longispinosum* (Bourne).

(Pl. XIII)

*Monstrilla longispinosa*, Bourne, Quart. Journ. Micr. Science, (2), Vol. 30, p. 575, Pl. 37, figs. 1—4, 10.

*Syn*: *Thaumaleus longispinosus*, Giesbrecht.

*Specific Characters*.—*Female*. Body rather slender, with the cephalic segment only very slightly dilated in the middle, and considerably exceeding half the length of the body. Tail very short, not even attaining the length of the 2 preceding segments combined; genital segment about the size of the last trunkal segment and, seen from above, of a very similar subquadrate form its ventral face considerably protuberant; ovigerous spines of quite an extraordinary length, attaining in some instances nearly the double length of the body, and confluent at the base for some distance; distal segment much narrower than the proximal one, being conspicuously constricted at the base, and without any trace of a subdivision. Caudal rami very small, scarcely longer than they are broad, and each only provided with 3 thickish setæ of equal length. Eye well developed, at least in female. Antennæ comparatively short and stout, scarcely exceeding in length  $\frac{1}{4}$  of the cephalic segment and, as in the other species of the present genus, only composed of 4 joints, the last of which is about the length of the other 3 combined and gradually narrowed distally, some of its setæ distinctly ramified. Oral tubule occurring far in front, at only at short distance from the frontal part of the head. Natatory legs with the terminal joint of the outer ramus unusually short, scarcely longer than the middle one, and of a rounded form. Last pair of legs provided at the obtusely truncated extremity with 3 plumose setæ, the innermost of which is a little shorter than the other 2; inner lobe well defined, triangular, and extending at right angle to the axis of the leg.

*Male* somewhat smaller than female and less slender of form, with the cephalic segment comparatively shorter and nearly of equal width throughout. Tail exceeding somewhat half the length of the exposed part of the trunk, and composed of 3 well defined segments, the middle of which is the smallest;

copulative appendage divided at the end into 2 comparatively short diverging lobes. Caudal rami of a similar shape to those in the female, but each provided with 4, instead of 3, setæ of nearly equal length. Antennæ comparatively much larger than in female, and each composed of 5 well defined joints, the 3 middle ones lamellarly expanded inside and armed with several short spines in addition to the setæ, last joint comparatively small, but very movably articulated to the preceding one. Natatory legs agreeing exactly in structure with those in female. 5th pair of legs wholly absent.

Body, as usual, much more transparent in female than in male, being in the latter, according to Giesbrecht, everywhere of a dark fuscous colour.

Length of adult female 2.60—3.16 mm., of male 2.30 mm.

*Remarks.*—The present form is chiefly characterised by the extraordinary length of the ovigerous spines in the female and their peculiar coalescence at the base. In its general appearance it bears a very close resemblance to the form recorded by Claparède under the name of *Monstrilla danæ*, and, were it not that no mention has been made by that author on the above-named distinguishing character, I should indeed have been much inclined to regard these 2 forms as identical.

*Occurrence.*—The present species, it is true, has not yet been observed off the Norwegian coast; but I regard it as very probable that on further investigations it will be found to occur in some place or other on the south and west coast. As I have had an opportunity of examining this form, I find it advisable to give here a detailed description of it, for comparison with the other 2 species. The figures given on Pl. XIII have been drawn from specimens collected during one of the Monaco-Expeditions in the Mediterranean off Sardinia.

*Distribution.*—British Channel (Bourne), Mediterranean at Naples (Giesbrecht).

#### Gen. 4. *Monstrillopsis*, G. O. Sars, n.

*Generic Characters.*—Body of very different appearance in the 2 sexes, being exceedingly slender in female, much shorter and stouter in male. Tail composed in female of 3 well defined segments, the middle of which is the smallest, in male distinctly 4-articulate. Caudal rami in both sexes of the very same structure, being unusually produced, and each provided with 4 well



developed setæ, 2 apical and 2 lateral. Eye very fully developed, especially in male. Antennæ in female 4-articulate, in male much larger and distinctly 5-articulate, with the usual hinge between the last 2 joints. Oral tubule occurring far in front. Natatory legs built in the usual manner. Last pair of legs, however, in female of rather a peculiar structure, being somewhat fusiform in shape, and each produced into 2 smooth conical lappets, the outer of which is the more prominent; setæ of these legs not, as usual, attached to the terminal edge of the leg, but arranged in a line crossing the base of the outer lappet. Male without any trace of these legs, but having the copulative appendage normally developed.

*Remarks.*—This new genus is established to include the anomalous form recorded by Scott under the name of *Monstrilla dubia*. Indeed, I have found it impossible to place this species either in the genus *Monstrilla* or in that of *Cymbasoma*, as it in some respects seems to combine characters of both these genera, in other respects to differ conspicuously from either of them.

## 12. *Monstrillopsis dubia*, (Scott).

Pl. XIV.

*Monstrilla dubia*, T. Scott, Twenty-second Ann. Rap. of the Fishery Board for Scotland, Part III, p. 247, Pl. XIII, fig. 14, Pl. XIV, figs. 16—18

*Specific Characters.*—*Femalc.* Body exceedingly slender and narrow, with the anterior division not at all dilated. Cephalic segment exceeding the remaining part of the body by  $\frac{1}{3}$  of its length, and narrow cylindrical in form, being almost of equal width throughout. Tail about equalling half the length of the exposed part of the trunk; genital segment a little longer than the other 2 segments combined and slightly dilated at the base, with the ventral face somewhat protuberant; ovigerous spines of moderate length; anal segment somewhat flattened and sharply defined from the rather small middle segment. Caudal rami rather produced, exceeding somewhat in length the 2 preceding segments combined, and slightly divergent, each ramus provided with 4 setæ, one about in the middle of the outer edge, 2 at the apex, and one inside at some distance from the end. Eye very conspicuous in the living animal, with dark pigment and all 3 lenses well developed. Antennæ exceeding somewhat in length  $\frac{1}{3}$  of the cephalic segment, and composed of 4 well defined joints, the last of which is fully as long as the other 3 combined; none of the setæ ramified. Oral tubule well marked, and occurring near the frontal part of the head. Natatory legs with the outer ramus con-

siderably longer than the inner, and having the terminal joint well developed. Last pair of legs rather narrow at the base, but considerably widening towards the end, which is produced to a conical lappet, across the base of which 3 slender setæ are attached; inner edge of the leg produced to a similar lappet, which, however, is quite smooth.

*Male* very unlike the female and of much smaller size, with the body much shorter and stouter. Cephalic segment somewhat club-shaped, and scarcely exceeding half the length of the body. Tail very narrow and composed of 4 well defined segments, the 1st of which is produced below to a rather large copulative appendage divided at the end into 2 diverging sub-cylindrical rami. Caudal rami of much the same appearance as in female, with the same number of setæ. Eye still more largely developed than in female, with the ventral lens rather prominent and highly refractive. Antennæ considerably exceeding half the length of the cephalic segment and distinctly 5-articulate, with the last very mobile joint abruptly attenuated distally.

Body in the living animal rather pellucid, with a pale yellow hue, and in some places dotted with a chestnut-coloured pigment.

Length of adult female 3.80 mm., of male 2.10 mm.

*Remarks.*—This form was described in the year 1904 by Scott from some female specimens taken in 2 different places of the Scottish coast. The resemblance of this form to *Monstrilla Danæ* Claparède, vindicated by Scott in a note to his description, I find to be a very slight one. In fact the present form is easily distinguishable both from this and from any other of the *Monstrillidæ*.

*Occurrence.*—Two specimens only of this remarkable form, a female and a male, have as yet come under my notice. They were captured, many years ago, at Bejan, outside the Trondhjem Fjord, and coloured drawings of both, when still alive, were immediately executed.

*Distribution.*—Scottish coast (Scott).

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## NOTODELPHYOIDA.

*Remarks.*—This division comprises a number of Copepoda, which partly differ considerably from each other and according to their organisation, represent several distinct types. Yet, all these forms agree as to habits, in so far that they live as parasites, or more properly as commensales, within Ascidians of different kinds. They were all by earlier authors comprised within a single family, the *Ascidicolidæ*, and this family was by Giesbrecht, together with the *Monstrillidæ* and several other heterogeneous groups, included in the 2nd tribe of his suborder *Podoplea*, for which the name *Ampharthrandria* was proposed. I have already mentioned, that the latter name is quite inapplicable for the present group of Copepoda, which comprises both forms with the anterior antennæ in the male transformed to prehensile organs, and such in which these antennæ are quite alike in the 2 sexes. According to the classification proposed by Giesbrecht, these latter forms should of course be transferred to his 1st tribe, the *Isokerandria*; but such a transfer appears quite unreasonable, since there are forms, otherwise closely related and even referred to one and the same genus, in which the above-named difference, as to the structure of the anterior antennæ, is found. Thus in the male of *Doropygus longicauda* Aurivillius, as will be shown farther on, these antennæ are very distinctly hinged, whereas in the other species referred to that genus they are quite alike in the 2 sexes. It is thereby clearly proved that the above-named character, upon which Giesbrecht laid so much stress, is of far inferior systematic value than opined by that author, and that it in reality must be considered unserviceable as the basis for a more general classification of the Copepoda. There are many other much more important diversities to be found on a comparison of the several forms comprised within the present group, and these diversities are in fact of such an essential quality as to make it inadmissible to include all these forms within a single family. This was also recognised by Thorell, who referred the forms observed by him to 3 different families, viz., *Notodelphyidæ*, *Ascidicolidæ* and *Bupruridæ*. The 1st of these families has subsequently been subdivided by Prof. Brady into 2 nearly-allied



families: *Notodelphyidæ* (proper) and *Doropygidæ*, and 2 other very distinct families, *Botryllophilidæ* and *Enterocolidæ*, are here added. The present division thus comprises at least 6 families, and I regard it as very probable, that their number will still be augmented, on a closer investigation of the many peculiar forms found by Hesse within compound Accidians, but rather imperfectly described by that author.

### Fam. 1. Notodelphyidæ.

*General Characters.*—Body in both sexes cyclopoid in shape and more or less straight, with the anterior division somewhat depressed, the posterior much narrower and cylindric in form. Exposed part of trunk composed in male of the usual number of segments, whereas in female the last 2 segments are confluent, forming together a large median piece somewhat broader in front than behind in young specimens, but in the adult female greatly expanded behind, to form dorsally a very voluminous, somewhat flattened bag or incubatory pouch, into which the ripe ova are received. Tail composed in both sexes of 5 segments not very different in size. Caudal rami well developed and provided at the end with strong ciliated setæ present in the usual number. Eye of the structure generally met with in the Copepoda. Anterior antennæ of moderate size, and extended laterally, being composed of numerous short joints densely clothed with setæ; those in male distinctly hinged. Posterior antennæ much smaller than the anterior, but distinctly prehensile, each terminating in a strong mobile claw. Oral parts, as a rule, well developed, and built on a somewhat similar type to that in the family *Cyclopinidæ*. The 4 anterior pairs of legs likewise cyclopoid in structure, and adapted for swimming; 5th pair of legs extremely small and rudimentary, biarticulate.

*Remarks.*—This family is here taken in a much more restricted sense than done by Thorell, who included into it also his 2 genera *Doropygus* and *Botachus*. In the restriction here adopted, the family only comprises 2 genera, viz., *Notodelphys* Allman and *Agnathaner* Canu.

# Gen. 1. **Notodelphys**, Allman, 1847.

*Generic Characters.*—Body more or less elongated, and in female conspicuously dilated in the middle on account of the greatly expanded matrical part; integuments rather soft and flexible. Cephalic segment not very large, and produced in front to an obtuse deflexed rostral prominence. The 2 succeeding segments in both sexes well defined and separated by deep lateral incisions. Incubatory pouch in female broad, flattened, more or less advancing over the base of the tail. The latter perfectly cylindrical in form, with the 1st segment in female scarcely larger than the succeeding ones, in male somewhat swollen and generally containing 2 oval spermatophores. Caudal rami, as a rule, finely ciliated on both edges, and each carrying at the tip 4 well developed and somewhat diverging plumose setæ, being moreover provided with 2 small bristles, the one attached to the outer edge, the other to the dorsal face, near the inner corner. Eye comparatively small, but easily observable in the living animal, being provided with 2 lateral lenses imbedded in a bright red pigment. Anterior antennæ in female gradually tapered distally, and generally composed of 15 joints clothed with comparatively short, but distinctly ciliated setæ; those in male having the number of joints somewhat reduced, and exhibiting between the penultimate and antipenultimate joints a well marked hinge. Posterior antennæ only composed of 3 distinctly defined joints, the first 2, representing the basal part, somewhat compressed and separated by an oblique suture, at the end of which outside 2 juxtaposed plumose setæ are attached; terminal joint very movably articulated to the basal part, and linear in form; apical claw accompanied by a number of short curved setæ. Anterior lip projecting at the end into 2 triangular lappets. Mandibles with the masticatory part lamellarly expanded and divided at the end into several unequal teeth; palp well developed, biramous. Maxillæ with all their constituent parts distinctly defined. Anterior maxillipeds with the 1st basal joint very large and massive, exhibiting inside 3 or 4 short setiferous lobes; 2nd basal joint much narrower, and armed at the end inside with a strong claw-like spine accompanied by a slender seta; terminal part thin, 3-articulate. Posterior maxillipeds much smaller than the anterior ones, and 3-articulate, 1st joint much the largest and provided inside with several short plumose setæ arranged in 2 groups, each of the other 2 joints armed with a slender incurved spine, that of the terminal joint accompanied by 2 small setæ. Natatory legs with the basal part broad and flattened, rami in all the pairs



distinctly 3-articulate and armed in the usual manner, those of 1st pair somewhat unequal, in the other pairs of about equal size. Last pair of legs extremely small, and in female quite concealed beneath the dilated matrical part of the body; proximal joint short and broad, and produced outside to a digitiform process tipped with a small bristle; distal joint more or less scale-like, with a small apical bristle and a short spine inside.

*Remarks.*—This genus was established as early as in the year 1847 by Allman, and may be regarded as the type, not only of the present family, but of the whole division *Notodelphyoida*. It comprises the most perfectly organised forms of that division, and exhibits some unmistakable relations to certain gnathostomous Cyclopoida, in particular the *Cyclopinidæ*. Indeed, the forms included in the present genus may be regarded as Cyclopoids, which by a close adaptation to the particular conditions of life as commensales of Ascidians, have acquired some extraneous characters apparently distinguishing them very essentially from their original ancestors. The genus was in the year 1859 subjected by Thorell to a careful investigation, and its general characters were made out by him in a very satisfactory manner. Thorell distinguished within the genus no less than 7 different species, all of which I have had an opportunity of examining from material collected off the Norwegian coast. These species are very closely related to each others, and as the distinctive characters given by Thorell in the short diagnoses in Latin, preceding the description of each species, appeared to be of a rather trifling kind, the validity of most of them has been questioned by recent authors. On a careful examination I have, however, come to the conclusion, that they all ought to be supported, though their distinction indeed is attended with no small difficulties, at least in the case of preserved specimens. I hope that the descriptions given below, in connection with the figures on the accompanying plates, may render the species more easily recognisable than this has been possible by consulting the work of Thorell.

### 1. *Notodelphys Allmani*, Thorell.

(Pl. XV & XVI)

*Notodelphys Allmanni*, Thorell. Bidrag til kännedomen om Krustaceer som lefva i Arter af släktet Ascidia, p. 31, Pl. I, Pl. II, 1.

*Syn:* *Notodelphys mediterranea*, Buchholtz.

*Specific Characters.*—*Female.* Body moderately slender, with the anterior division pronouncedly depressed, and nearly twice as long as the posterior. Cephalic segment scarcely longer than the 2 succeeding segments combined,

and gradually narrowed anteriorly, terminating in an obtuse point. Incubatory pouch, when fully developed, very broad, rounded quadrate in outline, with the posterior edge slightly concave in the middle. Caudal rami rather slender, sublinear in form, and more or less divergent, attaining nearly twice the length of the anal segment, and more than 4 times as long as they are broad, both edges distinctly ciliated; apical setæ of moderate length and rather divergent; bristle of outer edge occurring at a distance from the end equalling about  $\frac{1}{3}$  of the length of the ramus. Anterior antennæ nearly as long as the cephalic segment and rather thick at the base, but rapidly tapered distally, 3rd joint the largest, the 3 succeeding joints gradually diminishing in size, remaining joints very small; setæ attached to the anterior face of these antennæ rather coarse and very distinctly ciliated. Posterior antennæ moderately slender, with the terminal joint about the length of the other 2 combined. 1st pair of legs, as in the other species, differing from the succeeding ones by the presence, at the inner corner of the 2nd basal segment, of a short deflexed spine; rami moreover rather unequal, the outer one being considerably shorter than the inner and bent outwards in a peculiar manner, its 1st joint comparatively large and having the outer edge finely denticulate. Last pair of legs with the proximal joint rather broad and finely denticulate at the inner rounded corner, digitiform process considerably produced; distal joint small, scale-like and conspicuously contracted at the base, spine of inner edge accompanied proximally with a few small denticles.

*Male* of much smaller size than female, with the body gradually attenuated behind. Cephalic segment comparatively larger, exceeding in length the 3 succeeding segments combined. Last trunkal segment scarcely broader than the genital segment. Anterior antennæ of coarser structure than in female and only composed of 11 joints very unlike in size, the outer 2 rather elongate and forming together a very mobile piece, which admits to be impinged against the preceding part of the antenna. Posterior antennæ, oral parts, and legs of same structure as in female. Genital lobes contiguous at the base inside, and subtriangular in form, their extremity somewhat truncated and provided at the outer corner with a small bristle, at the inner with 2 unequal juxtaposed spines.

Body in the living animal semipellucid, with a light yellowish gray hue; ovarian tubes in female pale greenish, the ripe ova included within the incubatory pouch being of a somewhat darker green colour.

Length of adult female attaining 4.50 mm; of male 1.90 mm.

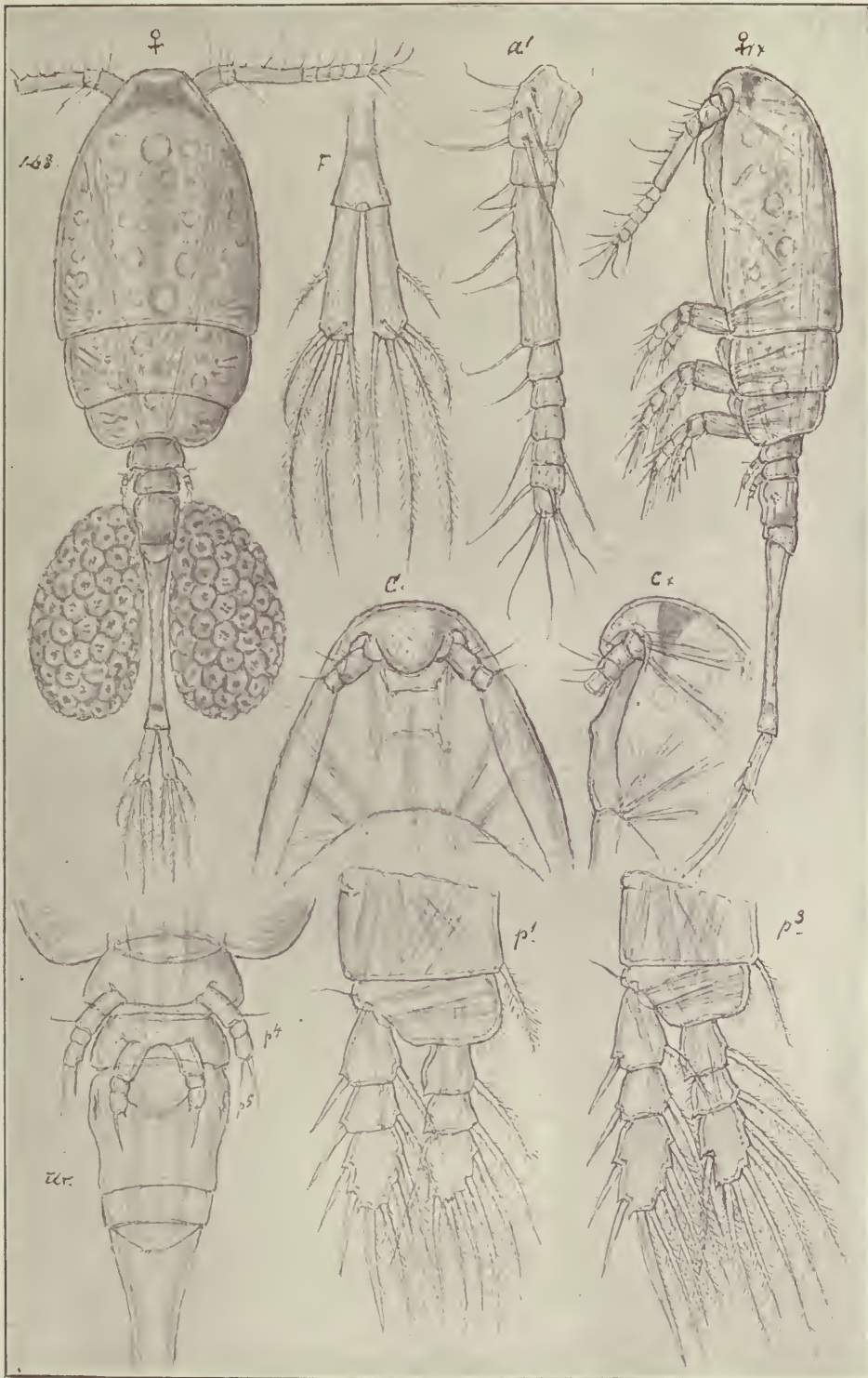
*Remarks.*—This is the largest and also the most common of the species,

# Copepoda

Thamatopsyllidæ

Monstrilloida

Pl. I



G. O. Sars del.

*Thamatopsyllus paradoxus*, G. O. Sars





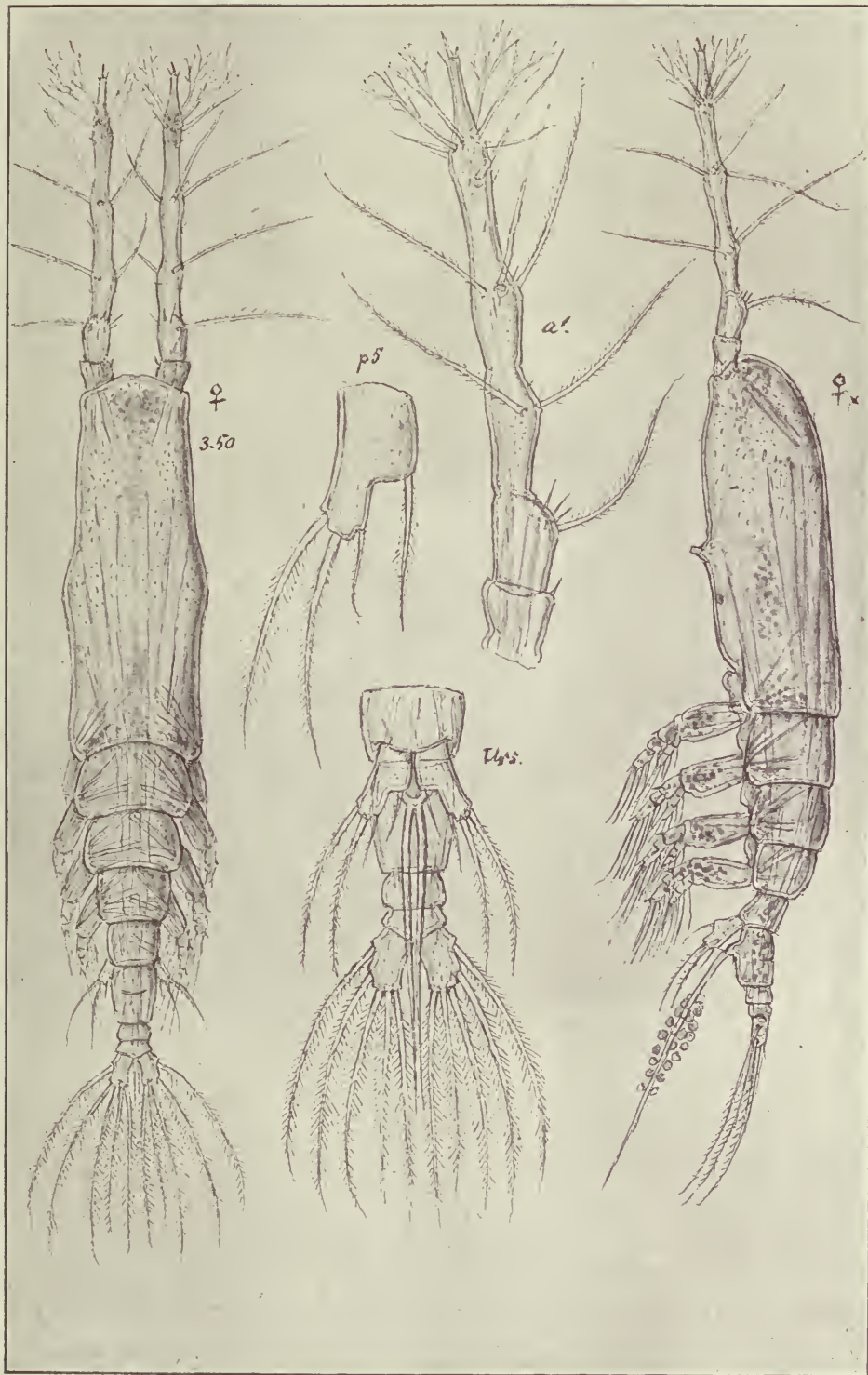


# Copepoda

Monstrillidæ

Monstrilloida

Pl. II



G. O. Sars del.

*Monstrilla longicornis*, Thomps.

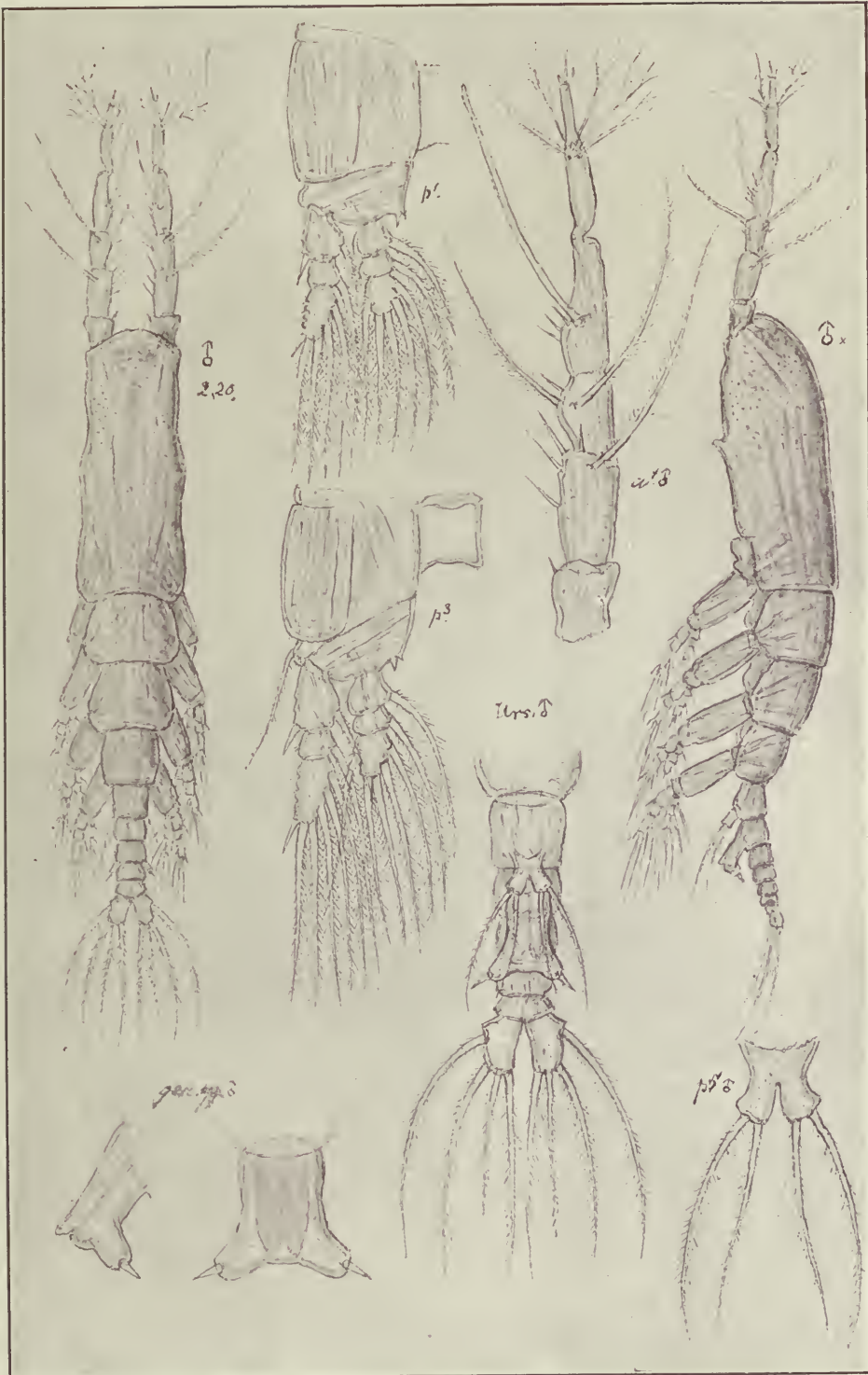


# Copepoda

Monstrillidæ

Monstrilloida

Pl. III



G. O. Sars del.

*Monstrilla longicornis*, Thomps.  
(continued)



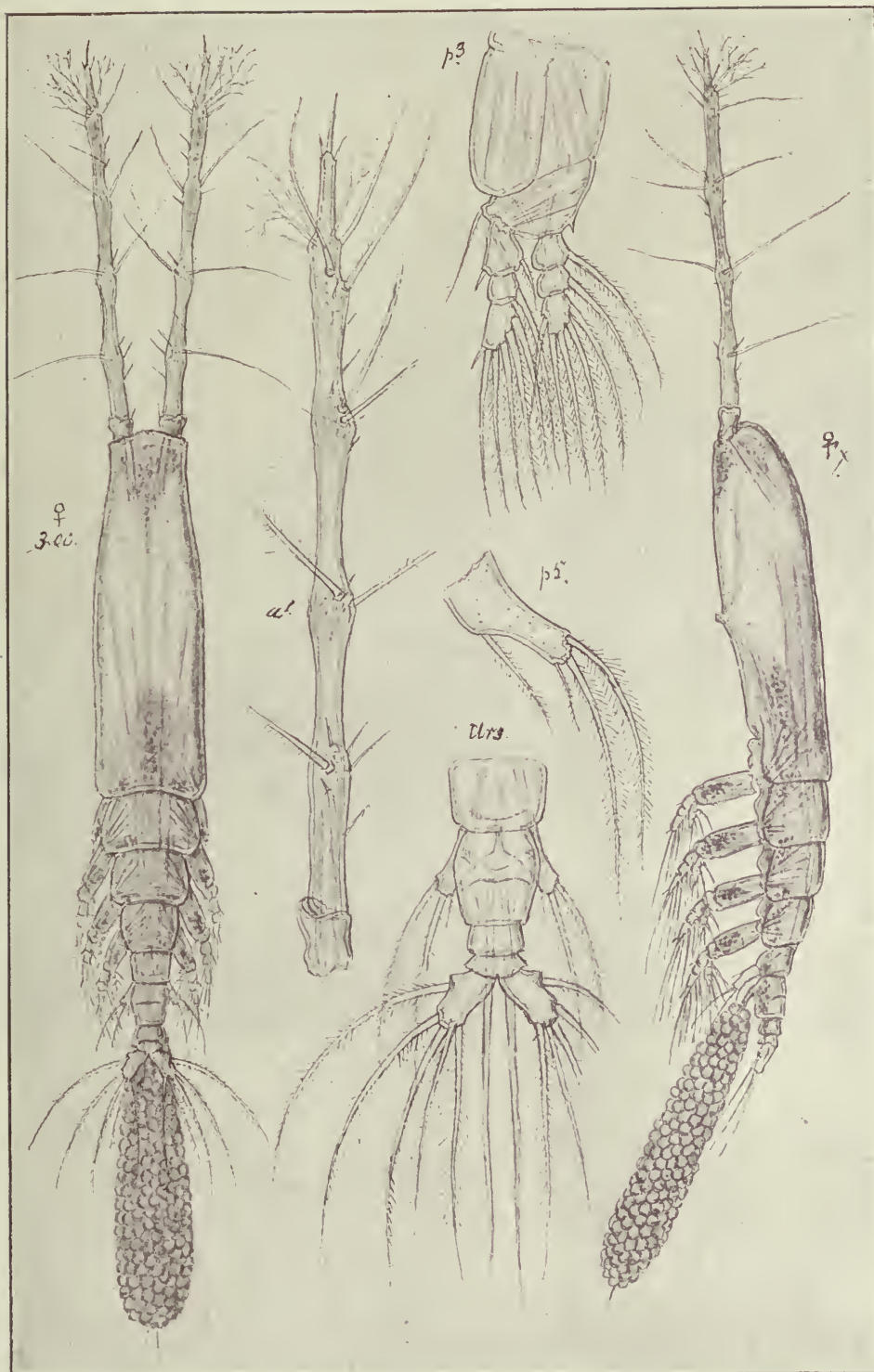


# Copepoda

Monstrillidæ

Monstrilloida

Pl. IV



G. O. Sars del.

*Monstrilla longiremis*, Giesbr.

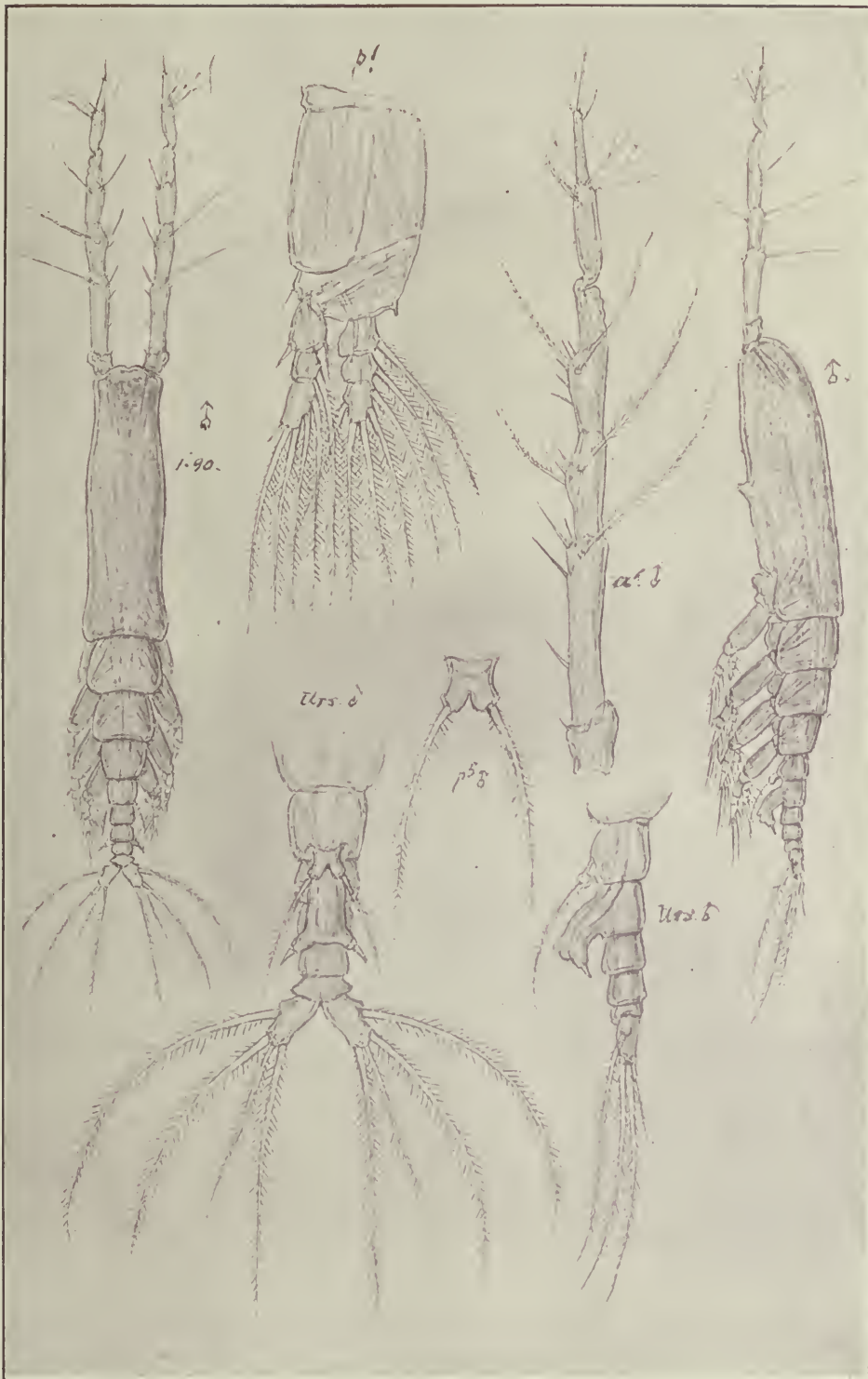


# Copepoda

Monstrillidæ

Monstrilloida

Pl. V



G. O. Sars del.

*Monstrilla longiremis*, Giesbr.  
(male)



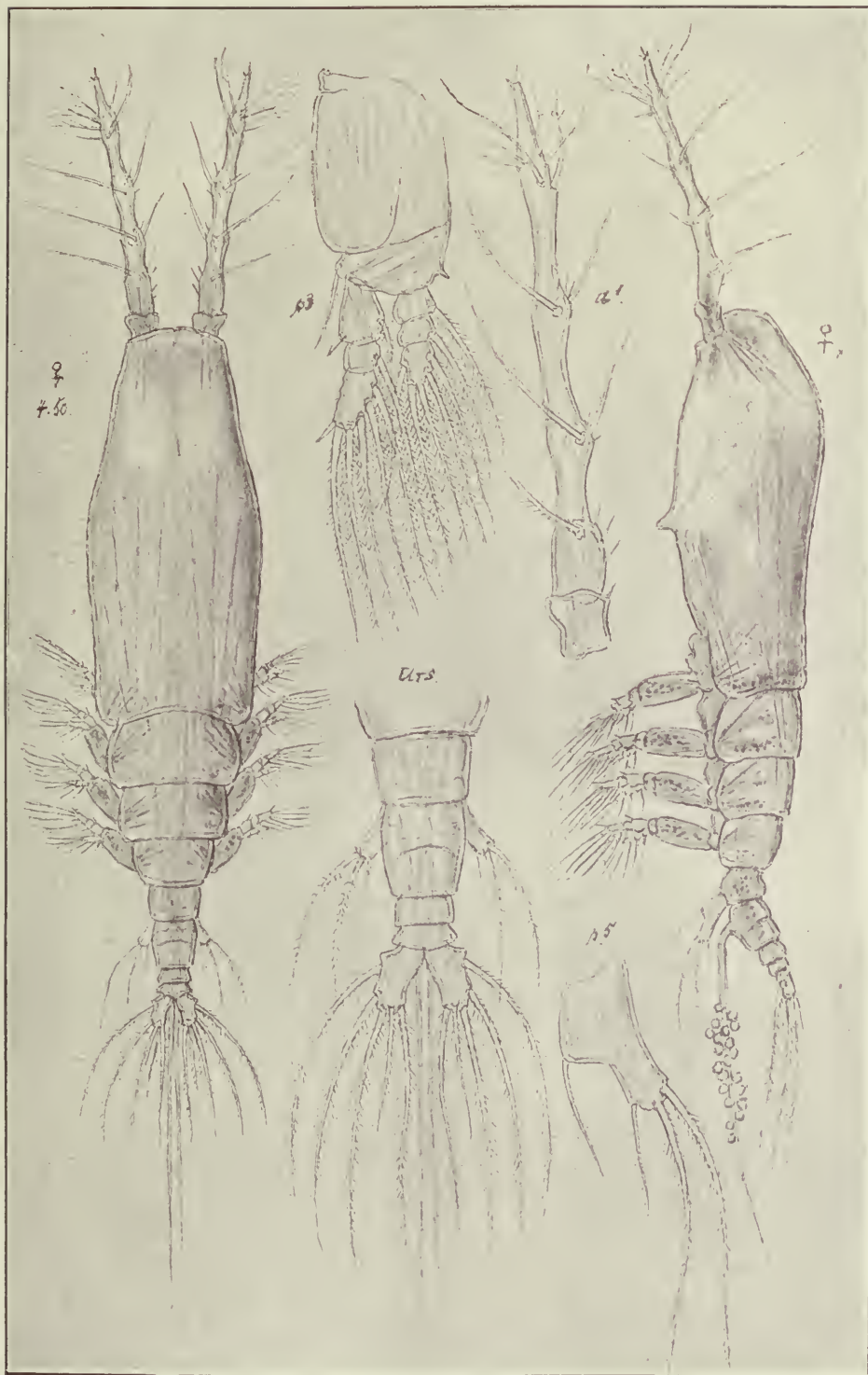


# Copepoda

Monstrillidæ

Monstrilloida

Pl. VI



G. O. Sars del.

*Monstrilla clavata*, G. O. Sars

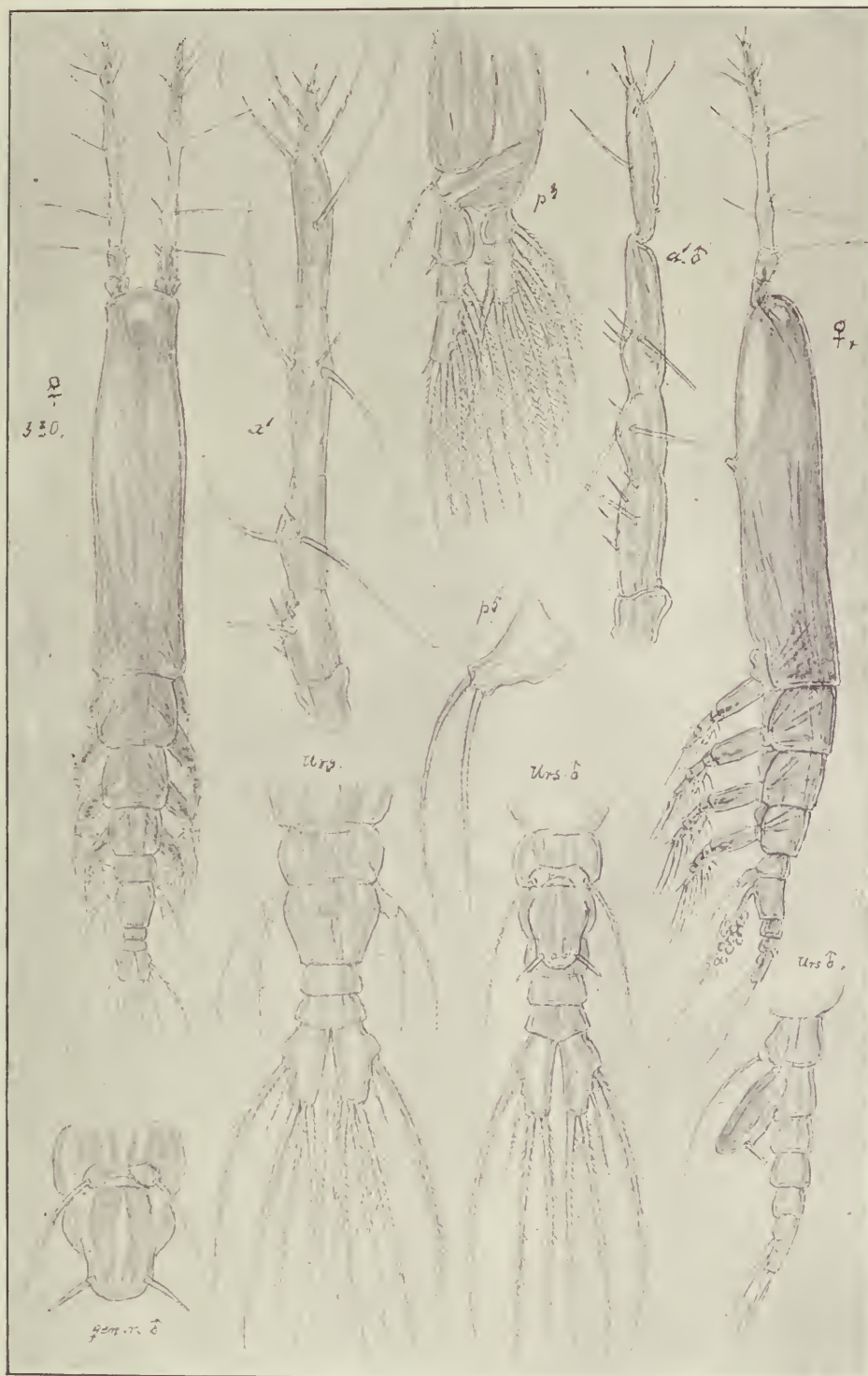


# Copepoda

Monstrillidæ

Monstrilloida

Pl. VII



G. O. Sars del.

*Monstrilla leucopis*, G. O. Sars



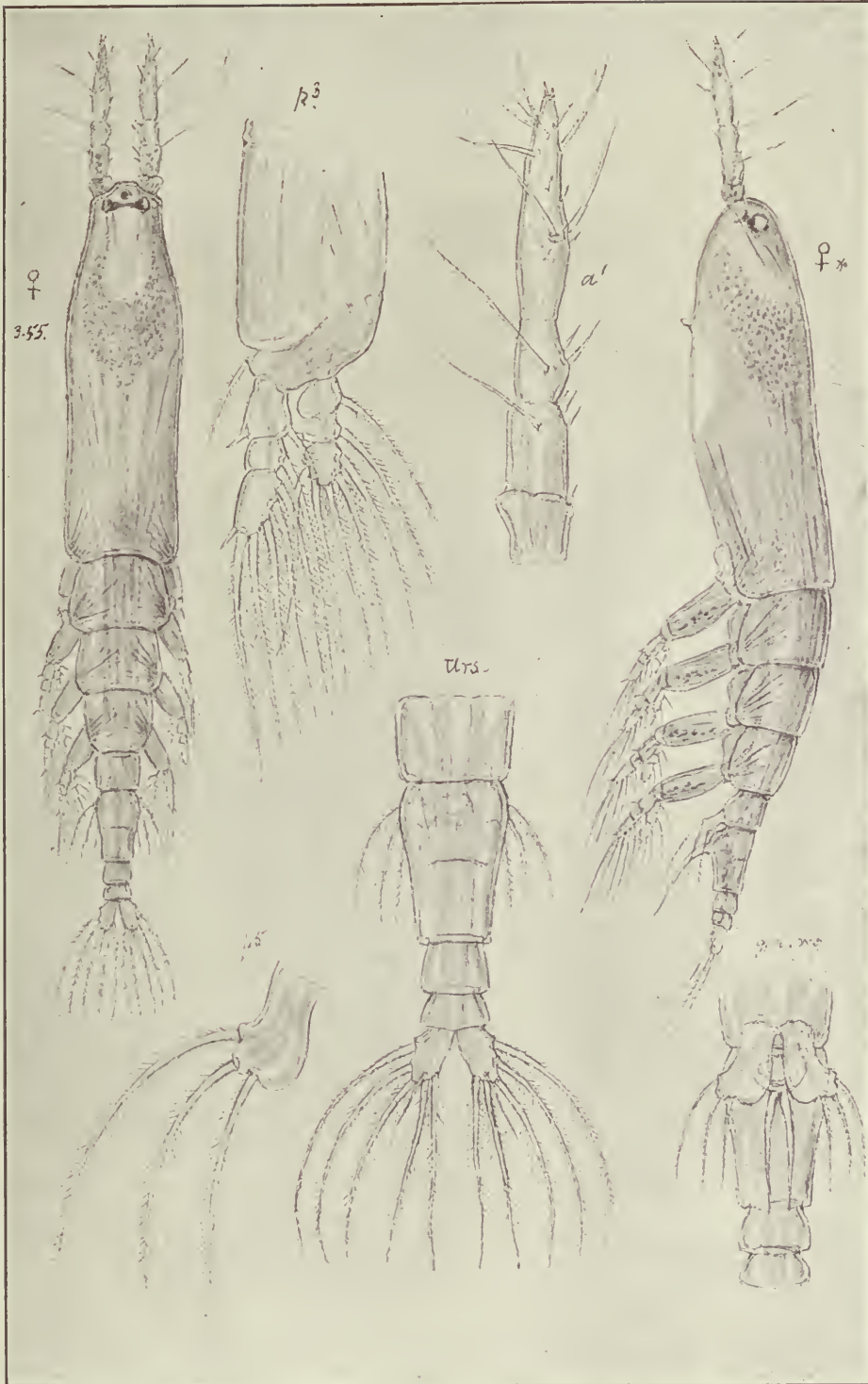


# Copepoda

Monstrillidæ

Monstrilloida

Pl. VIII



G. O. Sars del.

*Monstrilla gracilicauda*, Giesbr.

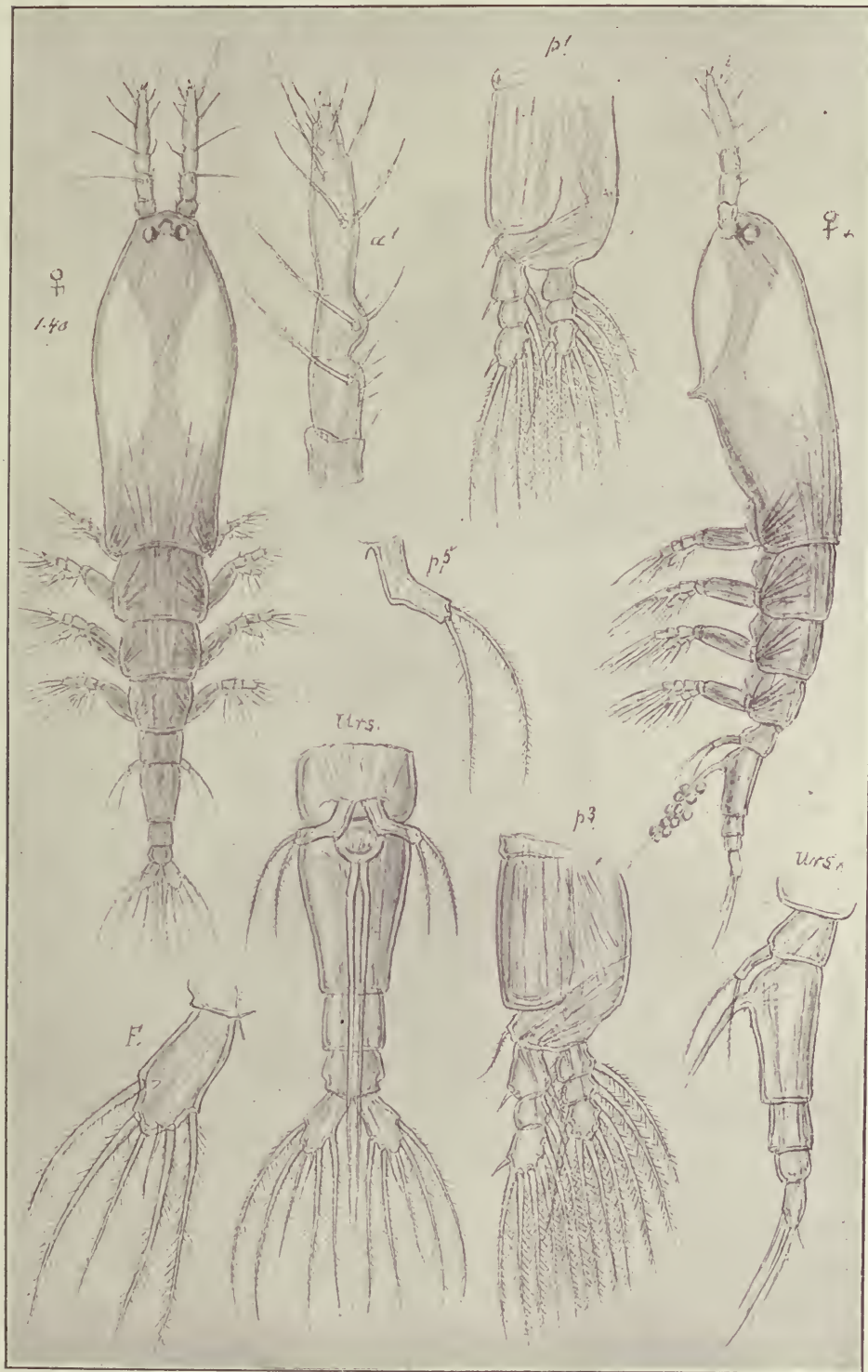


# Copepoda

Monstrillidæ

Monstrilloida

Pl. IX



G. O. Sars del.

*Monstrilla helgolandica*, Claus



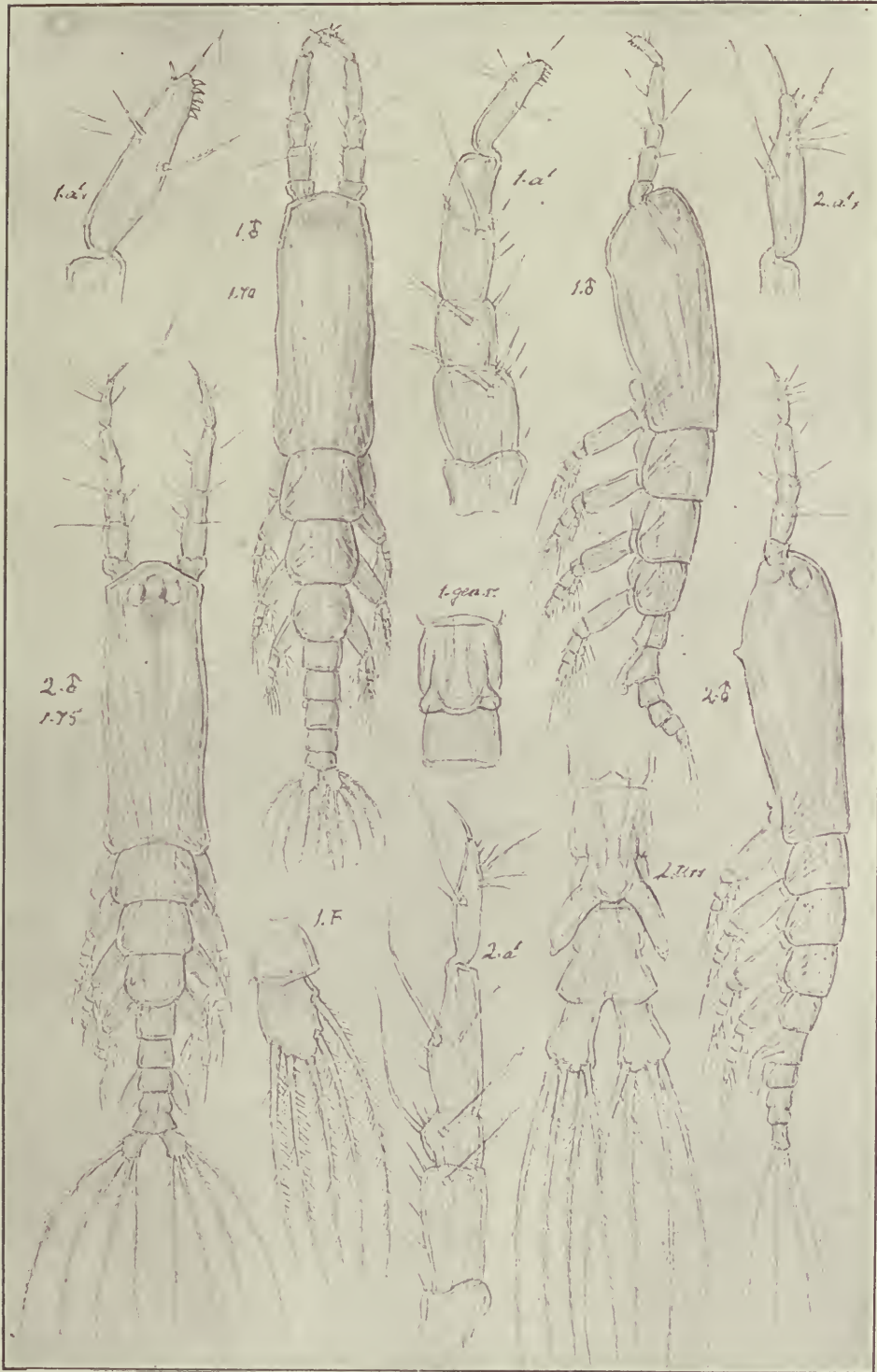


# Copepoda

Monstrillidæ

Monstrilloida

Pl. X



G. O. Sars del.

1. *Monstrilla serricornis*, G. O. Sars. ♂
2. *Cymbasoma rigidum*, Thomps. ♂

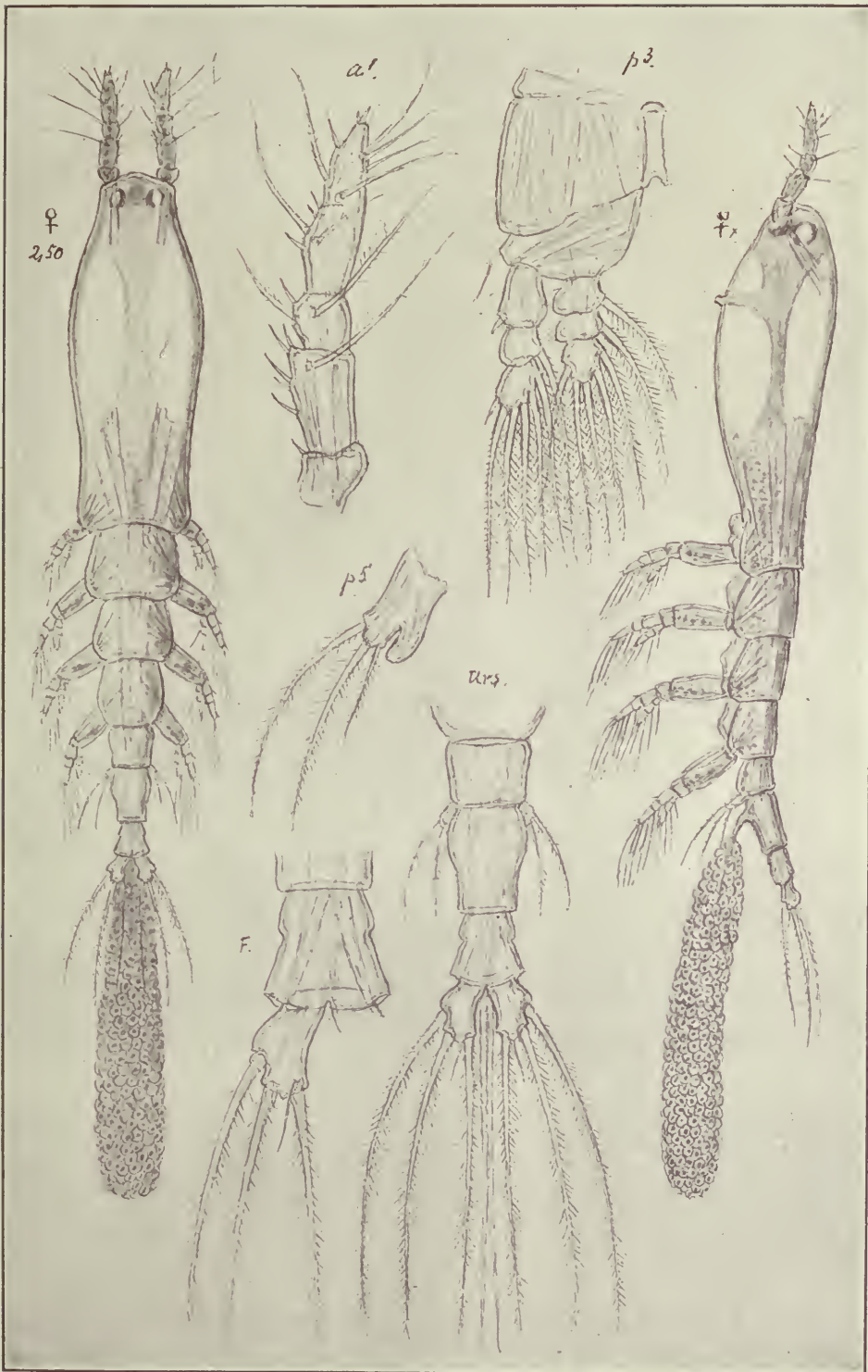


# Copepoda

Monstrillidæ

Monstrilloida

Pl. XI



G. O. Sars del.

*Cymbasoma rigidum*, Thomps.



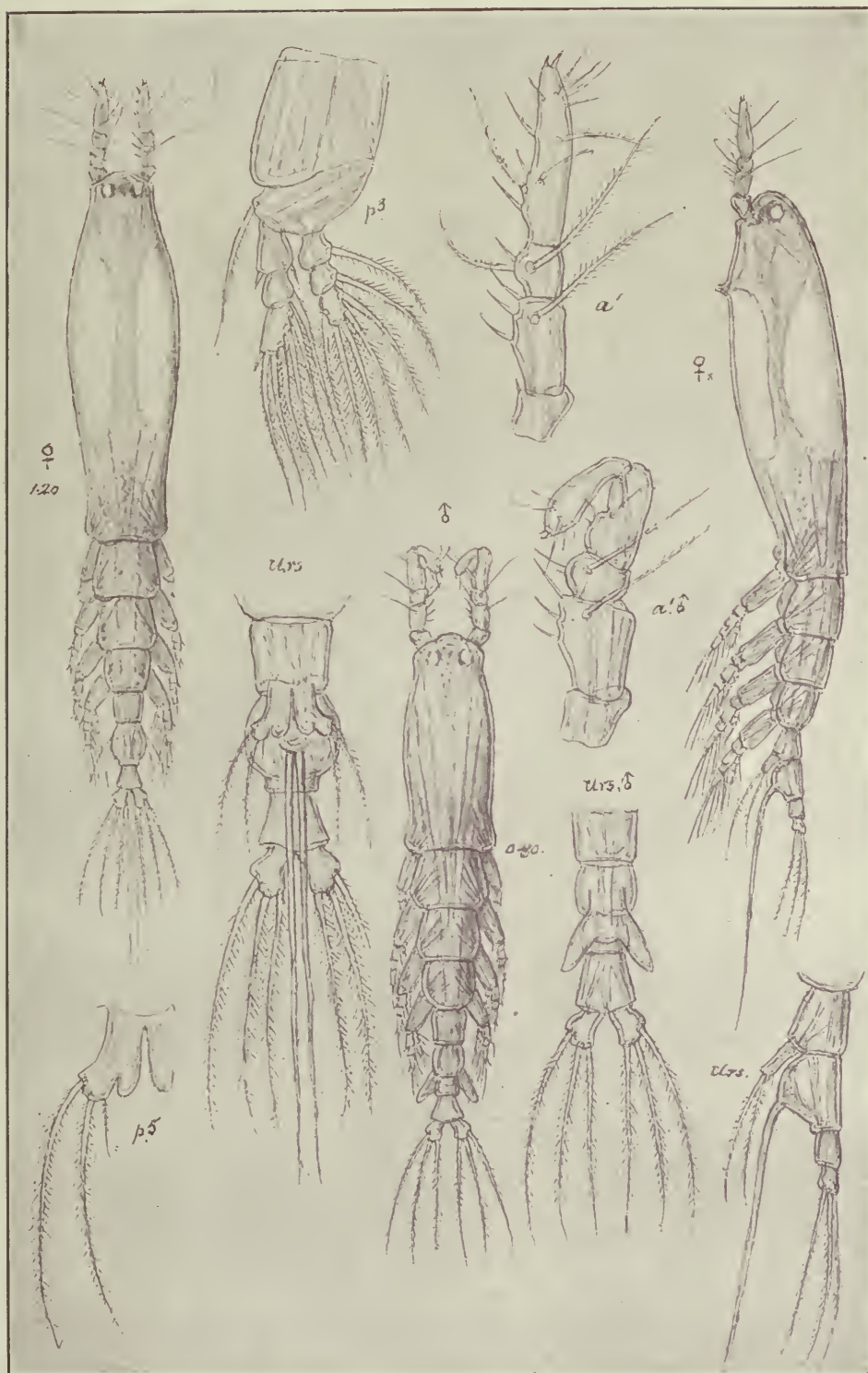


# Copepoda

Monstrillidæ

Monstrilloida

Pl. XII



G. O. Sars del.

*Cymbasoma Thompsoni*, (Giesbrecht)

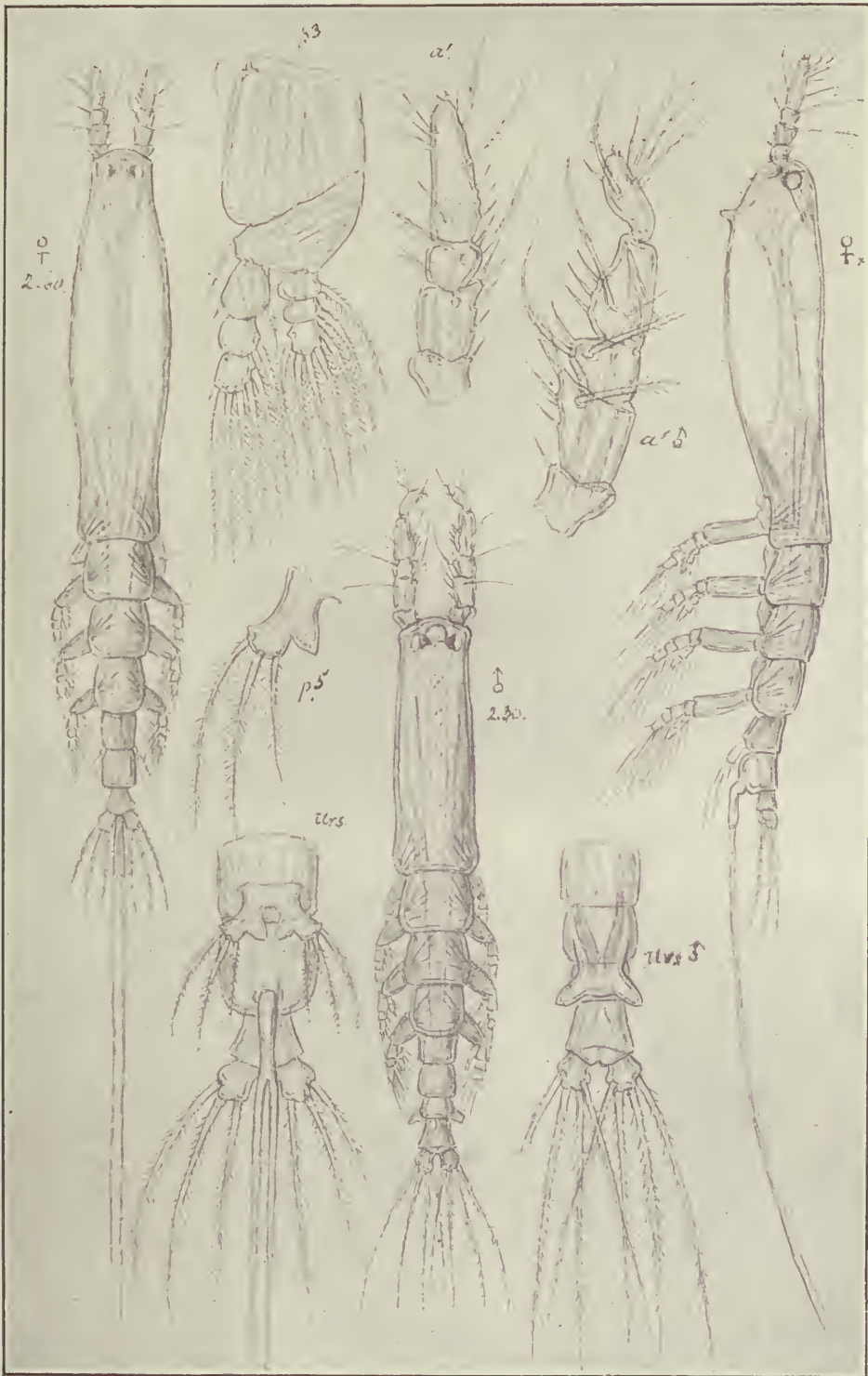


# Copepoda

Monstrillidæ

Monstrilloida

Pl. XIII



G. O. Sars del.

*Cymbasoma longispinosum*, (Bourne)



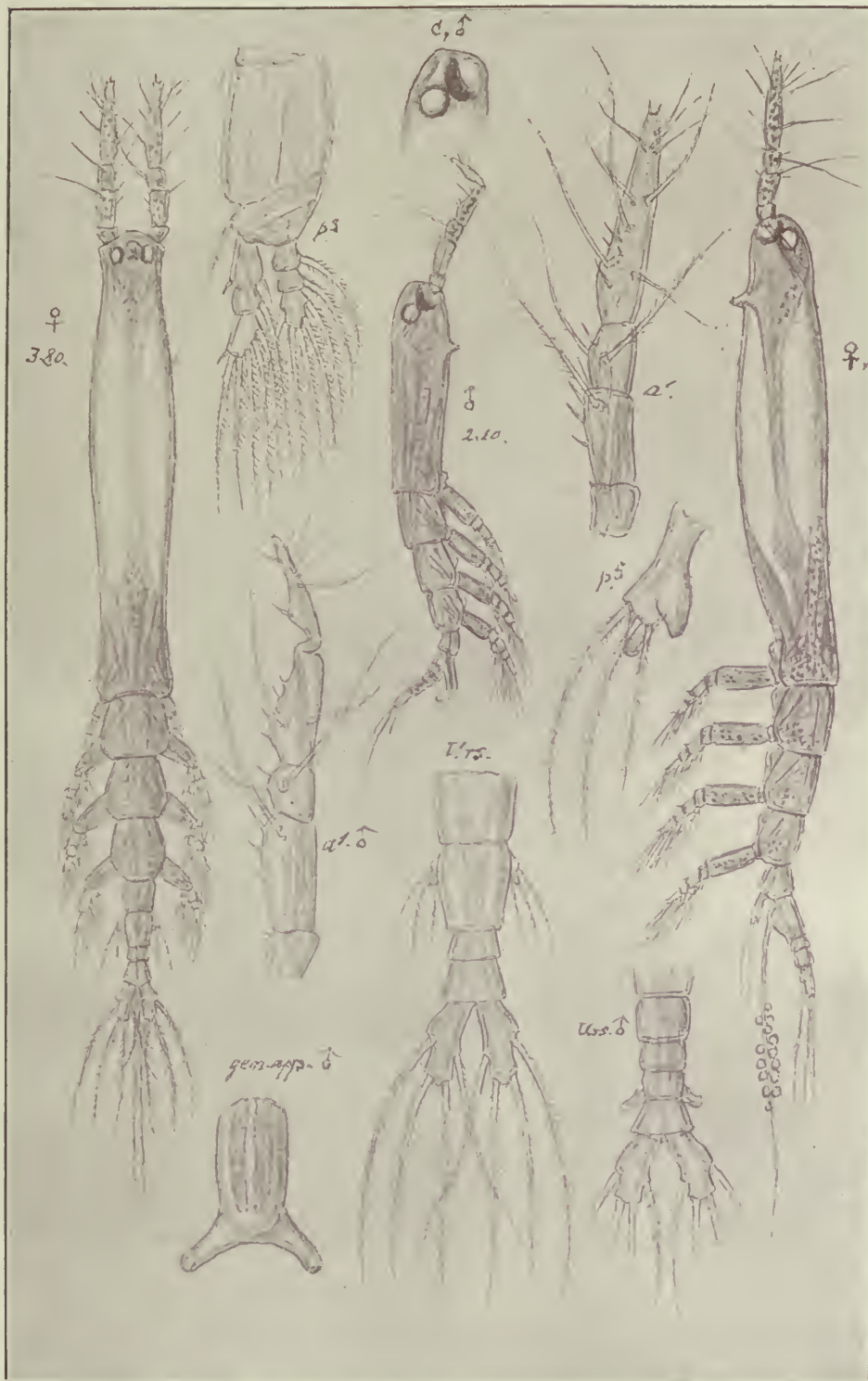


# Copepoda

Monstrillidæ

Monstrilloida

Pl. XIV



G. O. Sars del.

*Monstrilopsis dubia*, (Scott)

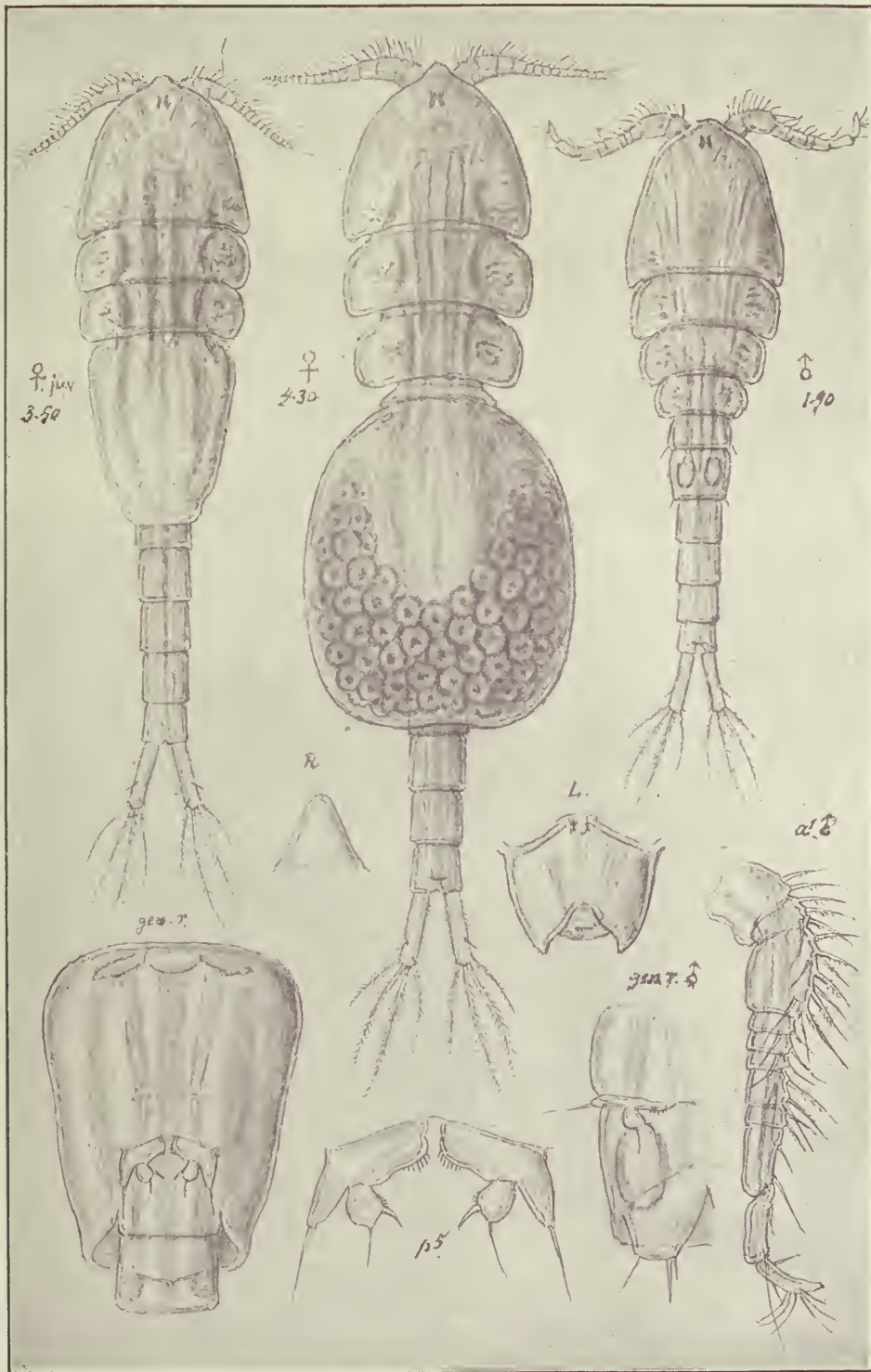


# Copepoda

Notodelphyidæ

Notodelphyoida

Pl. XV



G. O. Sars del.

*Notodelphys Allmani*, Thorell





and may moreover be recognised by the relative length of the caudal rami, by the shape of the incubatory pouch in the female, and, when examined in the living state, also by the colour of the ripe ova. It may be, that Allman has had before him specimens of this form, but as he has evidently combined in his species *N. ascidicola* several other very different forms, I agree with Thorell in the discarding of the specific name proposed by that author. The form recorded by Buchholtz from the Mediterranean under the name of *N. mediterranea* I am unable to distinguish from the present species.

*Occurrence.*—I have met with this species in many different places on the Norwegian coast, from the Christiania Fjord to Finmark (Hammerfest). It occurs, often in considerable number, within the branchial cavity of several kinds of simple Ascidians, being generally found attached by the aid of the posterior antennæ to the inner wall of that cavity. When loosened from its hold, the animal moves quickly about in the usual jerking manner observed in most Cyclopoida; but very soon it again get hold of some other place. Male specimens are much more scarce than female ones, and indeed among the numerous specimens of this species collected, I have only succeeded in finding 3 or 4 males.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Brady), coast of France (Canu), Mediterranean (Buchholz).

## 2. *Notodelphys rufescens*, Thorell.

(Pl. XVII, 1).

*Notodelphys rufescens*, Thorell, l. c. p. 35, Pl. II, 2.

*Specific Characters.*—*Female.* Body comparatively a little more slender than in *N. Allmani*, otherwise of a very similar appearance. Incubatory pouch oval in outline, with the posterior extremity evenly rounded. Caudal rami scarcely twice as long as the anal segment, and rather narrow, sublinear in form, with the apical setæ comparatively shorter and less divergent than in *N. Allmani*; bristle of outer edge more remote from the apex. Anterior antennæ almost exactly as in that species. Posterior antennæ however comparatively less slender, with the terminal joint not nearly attaining the length of the other 2 combined. Oral parts and natatory legs very like those parts in *N. Allmani*. Last pair of legs likewise very similar, though having the proximal joint comparatively less broad, and the distal joint of a more irregular shape.

Body, according to Thorell, in the living animal pellucid, of a whitish grey colour, with the ovarian tubes and the ripe ova pale reddish.

Length of adult female attaining 4.20 mm.

*Remarks.*—The present form is so closely allied to *N. Allmani*, that I have had much trouble in finding any more reliable character to distinguish it from that species. It is however of somewhat smaller size, and, on a closer comparison, the caudal rami are found to differ somewhat in their relative length, and more particularly in the position of the outer-edge bristle, which is conspicuously more remote from the apex than in *N. Allmani*. Moreover the shape of the incubatory pouch is rather different, and, according to Thorell, also the colour of the ovarian tubes and the ripe ova in the living animal.

*Occurrence.*—A few female specimens of this form were selected from some material collected many years ago off the south coast of Norway. From what species of *Ascidia* they were derived, I am unable to ascertain. Thorell found it in *A. scabra* Müll. and Aurivillius in *Phallusia obliqua* Alder.

*Distribution.*—Coast of Bohuslän (Thorell, Aurivillius).

### 3. *Notodelphys cærulea*, Thorell.

(Pl. XVII, 2).

*Notodelphys cærulea*, Thorell, l. c. p. 37, Pl. III & IV, 4.

*Specific Characters.*—*Female.* Body conspicuously more slender than in the 2 preceding species, with the anterior division narrower and the posterior more produced. Incubatory pouch oval in outline, with the greatest width somewhat in front of the middle, posterior extremity evenly rounded. Caudal rami rather shorter and broader than in the 2 preceding species, only very slightly exceeding in length the anal segment, and scarcely more than 3 times as long as they are broad; apical setæ comparatively short, bristle of outer edge considerably remote from the apex, being attached nearly in the middle of the edge. Antennæ, oral parts, and natatory legs not exhibiting any marked difference from those appendages in the preceding species. Last pair of legs, however, rather different in shape, the proximal joint being not nearly so broad, with the inner corner less prominent; distal joint rounded in shape and less conspicuously constricted at the base.

Body in the living animal whitish pellucid, with the ovarian tubes and the ripe ova of a bright bluish colour.

Length of adult female attaining 4.30 mm.

*Remarks.*—The above-described form may be easily distinguished from the 2 preceding ones by the comparatively much shorter and broader caudal rami, and by the position of the outer-edge bristle on these rami. In the living state the female of this species may moreover at once be recognised by the bright bluish colour of the ova included within the incubatory pouch.

*Occurrence.*—Several specimens of this form have been selected from material collected in different places on the south coast of Norway. Thorell found it rather frequently in *Ascidia venosa*, and Aurivillius records it from *Phallusea virginea*.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Brady).

#### 4. *Notodelphys agilis*, Thorell.

(Pl. XVII, 3).

*Notodelphys agilis*, Thorell, l. c. p. 40, Pl. IV & V, 6.

*Specific Characters.*—*Female.* Body moderately slender, resembling in shape that of *N. rufescens*, but of much smaller size. Incubatory pouch sub-oval in outline, slightly widening distally, with the hind extremity broadly rounded. Caudal rami rather slender, nearly twice as long as the anal segment, and somewhat narrowed in their outer part, with the outer edge finely ciliated, the inner smooth; apical setæ of moderate length; bristle of outer edge attached to a distinct ledge in the middle of the edge. Both pairs of antennæ somewhat more slender than in the 3 preceding species. Last pair of legs with the proximal joint rather broad and quite smooth, digitiform process comparatively short; distal joint not at all constricted at the base, and of a somewhat irregular form, with the outer edge angularly bent in the middle and the spine of the inner edge very thin.

Body in the living animal whitish pellucid, with the ripe ova dark fuscous in colour.

Length of adult female scarcely exceeding 3.60 mm.

*Remarks.*—This form also is most readily distinguished by the shape of the caudal rami, and more particularly by the exactly median position of the outer-edge bristle on these rami. Otherwise it agrees closely with the 3 preceding species.

*Occurrence.*—I have met with this form in many different places on the Norwegian coast, from the Christiania Fjord to Finmark (Hammerfest). It is found in different kinds of Ascidians, most frequently perhaps in *A. parallelo-*



*gramma*. In its movements it is more active than most other species, and thus deserves the specific name given to it by Thorell.

*Distribution*.—Coast of Bohuslän (Thorell), British Isles (Brady), coast of France (Canu).

### 5. *Notodelphys tenera*, Thorell.

(Pl. XVIII, 1).

*Notodelphys tenera*, Thorell, l. c. p. 36, Pl. III, 3.

*Specific Characters*.—*Female*. Body comparatively slender, with the anterior division somewhat dilated in its anterior part. Cephalic segment exceeding in length the 2 succeeding segments combined, and conically produced in front. Incubatory pouch, when fully developed, of rather a characteristic shape, being almost gibbously dilated in the middle and fully as broad as it is long. Caudal rami rather narrow, and exceeding the anal segment by about  $\frac{1}{4}$  of their length; apical setæ unusually slender and elongated; bristle of outer edge occurring close to the apex. Both pairs of antennæ conspicuously more slender and elongated than in the other known species. Last pair of legs with the proximal joint short, but rather broad, and having the digitiform process large and extended obliquely outwards; distal joint very narrow at the base, but gradually widening distally, so as to assume a somewhat claviform shape, spine and seta issuing close together from the inner distal corner.

Body in the living animal whitish hyaline, with the ripe ova yellowish red in colour.

Length of adult female 3.20 mm.

*Remarks*.—The present species may be recognised by the unusual slenderness of both pairs of antennæ and the rather elongated caudal setæ. The shape of the caudal rami and the position of the outer-edge bristle is also peculiar. Another easily observable distinguishing character, not mentioned by Thorell, is derived from the shape of the incubatory pouch, which differs conspicuously from that in any of the other known species.

*Occurrence*.—I have taken this form occasionally in 3 widely remote localities on the Norwegian coast, viz., Risør, Trondhjem Fjord, and Valdersund on the Nordland coast. The specimens were found in the branchial cavity of *A. canina*.

*Distribution*.—Coast of Bohuslän (Thorell).



6. *Notodelphys elegans*, Thorell.

(Pl. XVIII, 2).

*Notodelphys elegans*, Thorell, l. c. p. 39, Pl. IV, 5.

*Specific Characters.*—*Female.* Body less slender than in any of the preceding species, with the cephalic segment comparatively large, considerably exceeding the length of the 2 succeeding segments combined. Incubatory pouch nearly of equal width throughout and obtusely truncated behind. Caudal rami shorter and broader than in *N. tenera*, only slightly exceeding in length the anal segment, and scarcely more than 3 times as long as they are broad; apical setæ comparatively short; bristle of outer edge occurring at a short distance from the apex. Antennæ comparatively far less slender than in the said species, the posterior ones being in particular distinguished by the unusually short and stout terminal joint. Last pair of legs very unlike those in *N. tenera*, the proximal joint being nearly quadrate in form and finely denticulate inside, with the digitiform process extending straight backwards; distal joint broadly oval in form and scarcely at all constricted at the base, spine of inner edge rather strong.

Body of the living animal, according to Thorell, of a pale yellowish hue, with the ripe ova fuscous green.

Length of adult female about 3 mm.

*Remarks.*—This species may be easily distinguished from the preceding ones by the less slender form of the body and the shape of the incubatory pouch. The structure of the posterior antennæ, and more particularly that of the last pair of legs, is also rather peculiar. Moreover the caudal rami, as usual, exhibit some well marked distinguishing characters.

*Occurrence.*—Two or 3 female specimens only of this form have as yet come under my notice. They were selected from some material collected on the south coast of Norway, the exact locality not being noted. Thorell found this species within the branchial cavity of *Styela intestinalis*.

*Distribution.*—Coast of Bohuslän (Thorell), coast of France (Canu).

7. *Notodelphys prasina*, Thorell.

(Pl. XVIII, 3).

*Notodelphys prasina*, Thorell, l. c. p. 41, Pl. V, 7.Syn: *Notodelphys pusilla*, Buchholtz.

*Specific Characters.*—*Female.* Body comparatively short and stout, considerably dilated in its anterior part. Cephalic segment rather large, and conically produced in front. Incubatory pouch subquadrangular in outline,

being of almost equal width throughout and transversely truncated behind. Caudal rami very short, being scarcely as long as they are broad, and subquadrate in form, with the outer edge densely hairy; apical setæ rather strong, the 2 middle ones considerably longer than the others and conspicuously dilated at some distance from the base; bristle of outer edge occurring close to the apex. Anterior antennæ fully as long as the cephalic segment, and having the setæ rather long and slender. Posterior antennæ of the usual structure, with the terminal joint about the length of the other 2 combined. 1st pair of legs with the rami of nearly equal length, terminal joint of the outer one bent abruptly outwards, at nearly a right angle to the preceding part; joints of inner ramus triangularly produced at the end outside. Last pair of legs very small, with the proximal joint extending inwards as a narrow band-like plate finely spinulose at the edge, digitiform process recurved; distal joint comparatively small and subfusiform in shape, being conically produced at the end, spine of inner edge occurring about in the middle.

Body in the living animal rather pellucid, with the ovarian tubes and the ripe ova of a bright grass-green colour.

Length of adult female scarcely exceeding 1.80 mm.

*Remarks.*—This is much the smallest of the species here recorded, and may moreover at once be recognised by the very short caudal rami, as also, when examined in the living state, by the bright green colour of the ovarian tubes and the ripe ova. The form recorded by Buchholtz from the Mediterranean under the name of *N. pusilla* is quite certainly identical with Thorell's species.

*Occurrence.*—I have taken this form, often in considerable number, from the branchial cavity of several kinds of Ascidians, most frequently however in *Phallusia mentula*. It seems to be distributed along the whole south and west coasts of Norway, at least to the Trondhjem Fjord.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Brady), Mediterranean (Buchholtz).

## Gen. 2. *Agnathaner*, Canu, 1892.

*Generic Characters.*—Body (of male) resembling in shape that in *Noto-delplys*, being quite straight, with the anterior division somewhat dilated and well marked off from the posterior; the latter narrow and composed of 5 segments. Caudal rami sublinear in shape, with the normal number of setæ.

Antennæ and legs built on the very same type as in *Notodelphys*. Oral parts however (in male) considerably reduced, so as not to be adapted for mastication. Anterior lip transformed to a somewhat tubular prominence containing the outer part of the gullet. Mandibles with the palp normally developed, biramous, masticatory part however reduced to a short simple point. Maxillæ with the masticatory lobe likewise much reduced, but having the other parts distinctly defined. Anterior maxillipeds without any setiferous lobes inside, and terminating in a single straight spine. Posterior maxillipeds extremely small and rudimentary.

*Remarks.*—The exact limits of this genus cannot at present be stated, as only the male sex is as yet known. It is very likely to believe that the female will be found to exhibit several essential differences from the male, and it is even not improbable that the structure of the oral parts, upon which the present genus has chiefly been founded, will turn out to be rather different in the female sex. Canu placed this genus, on account of the reduced oral parts, next to the genus *Enterocola*. It is however otherwise very different from that genus, and evidently so closely related to *Notodelphys*, that in any case it ought to be included in the same family with it. Two different species of this genus have been recorded by Canu, both of them only observed in the male sex. The one of these species also occurs on the Norwegian coast, and will be described below.

#### 8. *Agnathaner typicus*, Canu.

(Pl. IX).

*Agnathaner typicus*, Canu, Copépodes du Boulonnais, p. 211, Pl. XVII, figs. 1—10.

*Specific Characters.*—*Male.* Body rather slender, with the anterior division conspicuously dilated in the middle. Cephalic segment comparatively large, occupying more than half the length of the anterior division, and gradually somewhat contracted anteriorly, frontal part narrowly truncated and produced below to a recurved rostrum. The 3 succeeding segments gradually diminishing in size, and having the epimeral plates somewhat exstant and separated by deep lateral incisions. Last truncal segment very small, with the lateral parts not expanded. Tail rather slender, almost attaining half the length of the anterior division, with the segments gradually diminishing in size behind; 1st segment somewhat swollen, to receive the 2 usual spermatophores. Caudal rami narrow linear in shape and not at all divergent, exceeding somewhat in length the anal segment, and about 3 times as long as they are broad; apical



setæ of very unequal length, the innermost but one being much the longest and nearly attaining the length of the tail, the innermost seta considerably smaller than the outermost; bristle of outer edge attached a little beyond the middle, dorsal bristle near the end of the ramus. Eye well developed. Anterior antennæ of moderate size, not however attaining the length of the cephalic segment, and composed of 13 well-defined joints rather densely clothed with setæ; hinge, as in *Notodelphys*, occurring between the penultimate and antepenultimate joints. Posterior antennæ almost of exactly same structure as in *Notodelphys*. Natatory legs well developed, with both rami 3-articulate and of about equal size, the outer one armed outside and at the tip with slender cultriform spines. Last pair of legs very small and rudimentary, with the proximal joint quite short and produced outside to the usual digitiform process; distal joint rounded, scale-like, with a thin bristle at the tip and a very minute spine inside.

Colour of the living animal not yet ascertained.

Length of the specimen examined 1.15 mm.

*Remarks.*—Though the figure of the animal (dorsal view) in Canu's work does not fully agree with that here given, I cannot doubt that these 2 forms are identical, as no obvious difference could be detected in the structure of the several appendages.

*Occurrence.*—A solitary male specimen of this form was found in some dredged material taken at Grimstad, south coast of Norway, from a depth of about 20 fathoms.

*Distribution.*—Coast of France (Canu).

## Fam. 2. Doropygidæ.

*General Characters.*—Body of female more or less compressed and curved ventrally, with the anterior and posterior divisions sharply marked off from each other; that of male more slender, with less sharply marked limit between the 2 chief divisions. Head well defined from trunk, and produced in front to a blunt rostral prominence, lateral parts deflexed and rounded off. 1st segment of trunk distinctly defined both in front and behind, but of much smaller size than the succeeding ones. The last 2 trunkal segments in female united, to form dorsally the large and prominent incubatory pouch. Tail



cylindrical in shape, and in most cases only composed of 4 distinctly defined segments. Caudal rami with the setæ much obliterated, in some cases apparently wholly absent, in other cases replaced by curved hooks. Anterior antennæ short and stout, deflexed, with the number of joints more or less reduced; those in male, as a rule, of the very same structure as in female. Posterior antennæ distinctly prehensile, terminating in a more or less strong claw. Oral parts on the whole well developed, though the posterior maxillipeds in some cases may be rather reduced. The 4 anterior pairs of legs, as a rule, not adapted for swimming, and of somewhat different structure in the different genera. Last pair of legs generally less rudimentary than in the *Notodelphyidæ*, rarely quite absent.

*Remarks.*—This family was proposed in the year 1878 by Prof. Brady, to include the 3 genera *Doropygus*, *Notopterophorus* and *Botachus*, which formerly were referred by Thorell to his family *Notodelphyidæ*. I am of opinion that this family ought to be maintained, although indeed some of the forms apparently exhibit a rather close relationship to the genus *Notodelphys*. However, as indicated in the above-given general characteristic of the family, certain very conspicuous peculiarities are found, which are common to all the forms, and by which the present family seems in reality to distinguish itself pretty well. Several well marked types are comprised within the family, and this has rendered it necessary to establish rather a great number of genera, some of which have been formerly combined within the genus *Doropygus* of Thorell. Seven different genera belonging to the present family will be treated of in the sequel, and 3 other genera, not represented in the Fauna of Norway, are also evidently referable to the same family, viz., *Goniodelphys* Buchholtz, *Doroixys* Kerschner, and *Bonnierilla* Canu. The family thus comprises at present no less than 10 genera.

As to habits, the forms comprised within this family agree with the *Notodelphyidæ* in so far that they, like the latter, lead a symbiotic existence within the branchial cavity of several kinds of Ascidians. Their mobility is however far inferior, and they seem indeed in most cases to be wholly devoid of swimming power, being only enabled to change their place within the branchial cavity of their hosts by a slow ramping motion. This applies not only to the females, but also to the males, with perhaps a single exception, viz., *Doropygopsis longicauda* (see farther below).

### Gen. 3. **Doropygus**, Thorell, 1859.

*Generic Characters.*—Body in female distinctly compressed, and exhibiting a pronounced ventral curvature; that in male more cylindrical in shape, and gradually tapered behind. Incubatory pouch very large and gibbously prominent behind. Tail narrow cylindric in form, and more or less abruptly bent downwards, last segment deeply cleft behind. Caudal rami more or less produced, narrowed distally, and only provided with very small rudiments of setæ. Anterior antennæ of the very same structure in the 2 sexes, being composed of 8 or 9 joints, the first 2 of which are very broad and compressed. Posterior antennæ scarcely shorter than the anterior, but much narrower, and highly chitinised, tapering distally, and armed at the tip with an apparently immobile claw. Mandibular palp with the outer ramus well developed, narrowly exerted at the end, and divided into 4 more or less distinctly defined joints. Endopodal part of maxillæ with a distinctly defined terminal joint. Anterior maxillipeds with the terminal part bi- or 3-articulate. Posterior maxillipeds more or less reduced. The 4 anterior pairs of legs with the basal part very thick and muscular, rami generally 3-articulate and of equal size. Last pair of legs with the proximal joint sub-quadrangular in form and not produced outside to any distinctly defined process, distal joint more or less slender, sub-linear in shape.

*Remarks.*—The present genus, being that established at the earliest date, must of course be regarded as the type of the family *Doropygidae*. It is here taken in a more restricted sense than done by Thorell and most other authors, some of the species referred by them to this genus having turned out to represent types of nearly allied genera. In the restriction here adopted, the genus as yet comprises 6 species, 3 of which have been found on the Norwegian coast and will be described below.

#### 9. **Doropygus pulex**, Thorell.

(Pl. XX).

*Doropygus pulex*, Thorell, l. c. p. 46, Pl. VI, 8.

Syn: *Doropygus pullus*, Buchholtz.

*Specific Characters.*—*Female.* Body comparatively short and stout, with the anterior division, seen laterally, oblong oval in form and somewhat widening distally. Incubatory pouch gently curved and greatly prominent behind, its posterior part being somewhat exerted and narrowly rounded at the end.

Tail about equalling in length half the anterior division, and apparently composed of 5 segments, the last one cleft by a deep angular insision into 2 diverging triangular lappets, carrying on the tips the caudal rami. The latter nearly twice as long as the anal segment, and of a narrow blade-like shape, tapering distally, and terminating in an obtuse point, on which slight rudiments of 3 or 4 setæ may be observed. Eye very small, but easily observable in the living animal. Anterior antennæ scarcely attaining the length of the head, and apparently composed of 8 joints clothed with comparatively short setæ, some of the joints exhibiting slight traces of a sub-division, the first 2 much larger than the others. Posterior antennæ rather slender and quite smooth, except at the tip, which is armed with a very strong curved claw accompanied by a small bristle. Endopodal part of maxillæ with 3 setæ inside the base; terminal joint comparatively small, quadrangular in form, and only provided with 2 setæ. Anterior maxillipeds with the terminal part well developed, and composed of 3 well defined joints. Posterior maxillipeds much reduced in size, each forming an undivided oval lamella clothed inside and at the tip with a number of thickish plumose setæ. The 4 anterior pairs of legs with the rami comparatively short and broad, the inner one in 1st pair distinctly 3-articulate, in the succeeding pairs however only biarticulate, the 2 outer joints being confluent. Last pair of legs with the distal joint somewhat cultriform in shape, and armed outside near the end with 3 small denticles, apex blunted and, as usual, provided with a spine and a very thin bristle.

*Male* of very small size, as compared with the female, and having the body gradually tapered behind, though curved in a similar manner. Structure of the several appendages much as in female.

Body of female, when alive, rather pellucid, with a slight whitish gray hue, ripe ova in the incubatory pouch generally of a dark fuscous or violaceous colour.

Length of adult female attaining 3.80 mm.; that of male scarcely exceeding 1.50 mm.

*Remarks.*—The present species is the type of the genus *Doropygus*, and may be easily recognised by the characteristic shape of the incubatory pouch in the female. The form recorded by Buchholtz from the Mediterranean under the name of *D. pullus* is evidently identical with Thorell's species. On the other hand, are the figures given by Brady on Pl. XXVIII in his monograph scarcely referable to the present species, but more properly to an immature specimen of *D. porcicauda*.



*Occurrence.*—I have met with this form in many different places on the Norwegian coast, from the Christiania Fjord at least to the Trondhjem Fjord. It is found, often in considerable number, within the branchial cavity of several kinds of Ascidians. When loosened from its hold, the animal rests nearly immobile on the bottom, lying on the one or other side. Only from time to time it is seen slowly to bend its body and to move the antennæ and legs, without however thereby to be enabled to change its place in any perceptible manner.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Brady), coast of France (Canu), Mediterranean (Buchholtz).

# 10. *Doropygus psyllus*, Thorell.

(Pl. XXI).

*Doropygus psyllus*, Thorell, l. c. p. 49, Pl. VII, 9.

*Specific Characters.*—*Female.* General form of the body rather like that in the preceding species, though perhaps still shorter and stouter. Incubatory pouch of very large size and quite evenly rounded behind. Tail scarcely attaining half the length of the anterior division, and, as usual, composed of 4 segments, the last of which, as in *D. pulex*, is cleft into 2 diverging triangular lappets. Caudal rami still more slender than in that species, otherwise of a very similar structure. Anterior antennæ composed of 9 well defined joints, the 1st of which is much the largest, occupying almost half the length of the antenna, 2nd joint much shorter but nearly as broad, and gibbously expanded in front, being armed with 2 short spines in addition to the setæ; the remaining part of the antenna abruptly much narrower and extending at an angle to the first 2 joints. Posterior antennæ very slender, exceeding in length the anterior ones, with the terminal joint considerably produced and somewhat curved, apical claw very small. Endopodal part of maxillæ with 4 setæ inside the base, terminal joint much larger than in *D. pulex* and of rounded oval form, being fringed with 6 plumose setæ. Anterior maxillipeds about as in *D. pulex*. Posterior maxillipeds however more fully developed, being composed of 2 well defined joints, distal joint however rather small, with 3 unequal setæ on the end. 1st pair of legs about as in *D. pulex*, the succeeding pairs however having both rami distinctly 3-articulate and rather slender, joints of outer ramus remarkably produced at the end outside. Last pair of legs with the distal joint comparatively narrower than in *D. pulex*, sublinear in form,



with the outer edge smooth, the inner clothed with a few bundles of small spinules.

Body in the living animal, according to Thorell, of a whitish grey hue, with the ripe ova fuscous green.

Length of adult female 2.30 mm.

*Male* unknown.

*Remarks.*—This form exhibits in its general appearance a rather close resemblance to *D. pulex*, and may indeed at the first sight easily be confounded with it. It is however of much inferior size, and, on a closer inspection, is found to differ conspicuously in the shape of the incubatory pouch. In the structural details, moreover, several well-marked differences are found, as indicated in the above diagnosis. The form recorded by Brady as *D. Normani*, seem to be very closely allied to the present species, but, to judge from the figures given by that author, it is scarcely the same species.

*Occurrence.*—Some few female specimens of this form were selected from material collected, many year ago, on the western coast of Norway, the exact locality not being ascertained.

*Distribution.*—Coast of Bohuslän (Thorell), coast of France (Canu).

## 11. *Doropygus porcicauda*, Brady.

(Pl. XXII).

*Doropygus porcicauda*, Brady, Monogr. British Copepoda, Vol. I, p. 138, Pl. XXVII, figs. 1—9, Pl. XXXIII, figs. 14—16.

*Specific Characters.*—*Female.* Body comparatively somewhat more slender than in the 2 preceding species, with the hind edge of the head and the 3 anterior trunkal segments elevated on each side dorsally to a small knob-like prominence. Incubatory pouch of very large size and greatly prominent behind, extending far beyond the limits of the tail, and terminating in an obtuse point. Tail unusually short, scarcely exceeding in length  $\frac{1}{3}$  of the anterior division, and composed of 4 segments, the penultimate of which exhibits a slight indication to a subdivision; last segment not expanded distally, though, as in the 2 preceding species, deeply cleft behind in the middle. Caudal rami of rather a peculiar shape, being greatly prolonged and terminating in a very flexible thin lash, which may be curled up in a remarkable manner, as indicated in the figure given by Brady. Anterior antennæ rather elongated, being fully as long as the head, and composed of 9 well defined joints, the first 2 of which, as usual, are much the largest, though combined scarcely exceeding half the

length of the remaining very slender part of the antenna; 1st joint provided near the end with 3 remarkably strong and densely plumose setæ, 2nd joint with 2 short spines in addition to the setæ. Posterior antennæ resembling in structure those in *D. psyllus*. Endopodal part of maxillæ with the terminal joint subfusiform in shape, and fringed inside with 5 setæ gradually increasing in length distally, its tip somewhat exerted and carrying 2 subequal setæ. Anterior maxillipeds with the terminal part comparatively short and only composed of 2 joints. Posterior maxillipeds distinctly biarticulate, distal joint slightly constricted near the end. The 4 anterior pairs of legs with both rami distinctly 3-articulate, and gradually increasing in length behind, those of 4th pair remarkably long and narrow, with most of the setæ obliterated. Last pair of legs of a similar structure to those in the 2 preceding species, but of comparatively smaller size.

Colour of the living animal not yet ascertained.

Length of the specimen examined 3.40 mm.

*Male* unknown.

*Remarks*.—The present species may at once be recognised by the peculiar structure of the caudal rami, a character which indeed has given rise to the specific name proposed by Brady. The shape of the incubatory pouch is also rather characteristic, and some peculiarities are moreover found in the structural details, as indicated in the above diagnosis.

*Occurrence*.—A solitary female specimen only of this distinct species has as yet come under my notice. It was obtained, many years ago, at Hvalør outside the Christiania Fjord, and, as far as I remember it, was taken from the branchial cavity of a *Corella parallelogramma*.

*Distribution*.—British Isles (Brady).

#### Gen. 4. **Doropygopsis**, G. O. Sars, n.

*Generic Characters*.—Body comparatively more slender than in *Doropygus*, distinctly curved in female, straight in male. Incubatory pouch of moderate size. Tail composed in both sexes of 4 segments, the last not cleft behind. Caudal rami slender and narrow, with the apical setæ less rudimentary than in *Doropygus*. Anterior antennæ in female of a similar structure to that in the said genus; those in male however conspicuously transformed and distinctly prehensile. Posterior antennæ rather unlike those in *Doropygus*, and more resembling in structure those in the *Notodelphyidæ*. Oral parts well developed

in both sexes. Mandibular palp with the outer ramus shorter than the inner, forming a rather broad undivided plate fringed with the usual number of strong plumose setæ. Endopodal part of maxillæ with the terminal joint distinctly subdivided. Posterior maxillipeds composed of 3 well defined joints. The 4 anterior pairs of legs more perfectly developed than in *Doropygus* and apparently adapted for swimming, at least in the male; both rami 3-articulate. Last pair of legs built on the same type as in *Doropygus*.

*Remarks.*—This new genus is established, to include the form recorded by Aurivillius under the name of *Doropygus longicauda*. A closer examination of this form, and more particularly of the hitherto unknown male sex, has led me to the conclusion, that it more properly should be separated generically from *Doropygus*. The genus, though undoubtedly referable to the present family, exhibits a closer affinity to the *Notodelphyidæ*, than does any of the other genera here treated of, and appears indeed in some respects to form a connecting link between these 2 families.

## 12. *Doropygopsis longicauda*, (Aurivillius).

(Pl. XXIII).

*Doropygus longicauda*, Aurivillius, Bidrag til kännedomen om Krustaceer, som lefva hos Mollusker och Tunicater, p. 18, Pl. III.

*Specific Characters.*—*Female.* Body rather slender and only slightly compressed, exhibiting the usual ventral curvature. Head comparatively large, fully attaining the length of the 2 succeeding segments combined, with the lateral edges evenly curved in front, but almost straight in the middle; rostral prominence very small. Incubatory pouch well developed and rather prominent behind, with the extremity quite evenly rounded. Tail about half the length of the anterior division, and narrow cylindrical in form, last segment smaller than the others and nearly transversely truncated at the end. Caudal rami slender and narrow about twice the length of the anal segment, and provided at the obtusely pointed tip with 4 well defined, though comparatively small setæ; 2 minute bristles moreover present on each ramus the one attached to the outer edge at a short distance from the base, the other occurring inside nearer the apex and somewhat dorsally. Anterior antennæ shorter than the head and, as usual, deflexed, being composed of 9 well defined joints rather densely clothed with setæ; 1st joint with 2 very strong plumose setæ near the end; 2nd joint without any spines. Posterior antennæ with the basal and terminal parts sharply marked



off from each other, the former provided at the end of the 1st joint behind with a well developed plumose seta; terminal part a little shorter than the basal one, and provided outside, at some distance from the end, with 2 small juxtaposed setæ; apical claw of moderate size and accompanied by 2 curved bristles. Endopodal part of maxillæ with the terminal joint rather produced and fringed inside with 3 setæ, its outermost part cut off as a well defined apical joint carrying 4 setæ. Posterior maxillipeds with the middle joint well defined, and armed inside with a curved spiniform seta; terminal joint comparatively small and fringed with 4 setæ. The 4 anterior pairs of legs with the rami rather slender and somewhat unequal in size, the inner one being the longer, especially in 1st pair; spines of outer ramus very thin, almost setiform. Last pair of legs with the proximal joint very broad at the base; distal joint slender, sublinear, with the edges somewhat waved and clothed with small hairs and spinules.

*Male* of smaller size than female, and rather unlike it in its general appearance, the body being very slender, attenuated behind, and quite straight, with the 1st trunkal segment united with the head. Caudal rami still more slender than in female, and having the apical setæ more fully developed and distinctly ciliated. Anterior antennæ built on the very same type as in the male *Notodelphyidæ*, being composed of 10 joints, the last 2 of which are much larger than in female and together form a movable terminal part admitting to be impinged against the preceding part of the antenna. The remaining appendages of exactly same structure as in female.

Body of female, in the living state, of a uniform light reddish hue; ripe ova of a similar, though somewhat darker colour.

Length of adult female attaining 4.50 mm., of male 2.40 mm.

*Remarks.*—The above described form, the only species as yet known of the present genus, may be easily distinguished from the other *Doropygidæ* by its comparatively slender and less compressed body, as also by the unusually long and narrow caudal rami. The female is at once recognised as a true *Doropygid* by the characteristic ventral curvature of the body and the gibbously prominent incubatory pouch. The male, on the other hand, may on the first sight easily be taken for a *Notodelphyid*, exhibiting, as it does, a much similar form of the body and a similar transformation of the anterior antennæ.

*Occurrence.*—Several specimens of this form have been collected by me at different times and in different places, both on the south and west coasts of Norway. Most of the specimens were taken from the branchial cavity of



*Phallusia obliqua*. The animal, when alive, is rather more mobile than the other Doropygidæ, and even females encumbered with ripe ova are seen, when loosened from their holds, moving to some extent freely in the water, though in a rather clumsy manner. The males are much more agile and are scarcely in this respect overmatched by the Notodelphyidæ. Indeed, one of the male specimens obtained was found out of his host, swimming quickly about together with other free-living Copepoda.

*Distribution*.—Coast of Bohuslän (Aurivillius).

### Gen. 5. *Doropygella*, G. O. Sars, n.

*Generic Characters*.—Body comparatively short and stout, being scarcely at all compressed. Head remarkably large and broad, produced in front to a deflexed conical rostrum. Incubatory pouch not much prominent. Tail composed in both sexes of 4 segments, the last of which is transversely truncated behind. Caudal rami quite simple, terminating in a blunt point, and without any distinctly defined setæ. Anterior antennæ short and deflexed, with the proximal joints very broad and compressed; those in male not transformed. Posterior antennæ strongly built and nearly smooth, apical claw well developed. Mandibular palp with the outer ramus undivided. Endopodal part of maxillæ with a distinctly defined terminal joint extending outwards along the exopodal lamella. Anterior maxillipeds rather robust, but with the terminal part poorly developed. Posterior maxillipeds distinctly 3-articulate. The 4 anterior pairs of legs of comparatively small size and not adapted for swimming, basal part broad and flattened, rami in all the pairs 3-articulate, but rather short, with the setæ poorly developed. Last pair of legs small, with the distal joint scale-like.

*Remarks*.—This genus also is founded upon a single species detected by Aurivillius and referred by him to the genus *Doropygus*. Several peculiarities found in this species, both as regards the outward appearance of the body and the structure of some of the appendages, have however led me to the conclusion, that it more properly ought to be regarded as the type of a separate genus.

#### 13. *Doropygella Thorelli*, (Aurivillius).

(Pl. XXIV)

*Doropygus Thorelli*, Aurivillius, l. c. p. 45, Pl. V.

*Specific Characters*.—*Female*. Body of a rather short and clumsy form, exhibiting the usual ventral curvature. Head unusually large and expanded, exceeding both in height and width the adjoining part of the trunk, seen

dorsally almost semicircular in outline; rostral prominence terminating in a knob-like point. The 3 succeeding segments gradually increasing in size, with the lateral parts not extant. Incubatory pouch subquadrangular in shape and scarcely dilated behind, with the extremity transversely truncated and slightly overlapping the base of the tail. The latter about half the length of the anterior division, with the last segment considerably larger than the preceding one and not dilated distally. Caudal rami comparatively short, scarcely exceeding half the length of the anal segment, and terminating in a blunt point. Eye apparently absent. Anterior antennæ scarcely attaining half the length of the head, and composed of 8 joints, the 3 or 4 proximal ones lamellarly expanded, the 4 outer joints abruptly much narrower. Posterior antennæ with the middle joint somewhat dilated; apical claw well developed and accompanied by 2 very small bristles. Endopodal part of maxillæ with 3 setæ inside the base, terminal joint somewhat fusiform in shape and edged with 6 setæ, 2 of which issue from the strongly convex inner edge, the 4 others from the tip. Anterior maxillipeds with the claw-like spine issuing from the 2nd basal joint very strong, terminal part short, biarticulate. Posterior maxillipeds with the middle joint quite unarmed, terminal joint carrying 3 subequal setæ. The 4 anterior pairs of legs somewhat diminishing in size behind, and wanting the usual plumose seta inside the 1st basal segment; outer ramus in all the pairs larger than the inner and armed outside with strong spines. Last pair of legs with the proximal joint rather broad at the base and provided at the end outside with the usual small bristle; distal joint scale-like, with the outer edge boldly curved, tip provided with a single small bristle.

*Male* resembling in shape the males of most other Doropygidæ, being however easily recognisable by the large size of the head.

Body in the living animal of an uniform whitish colour.

Length of adult female 2.10 mm., of male 1.50 mm.

*Remarks.*—The present form may be easily recognised from the other known Doropygidæ by its short and clumsy body, and more particularly by the unusual development of the head and the characteristic shape of the incubatory pouch.

*Occurrence.*—I have taken this form not unfrequently in several places, both of the south and west coasts of Norway. It is generally found within the branchial cavity of *Phallusia obliqua*, more rarely in that of other kinds of Ascidians. The animal is very slow in its movements, and is quite unable to move freely in the water.

*Distribution.*—Coast of Bohuslän (Aurivillius).

## Gen. 6. **Pachypygus**, G. O. Sars, n.

*Generic Characters*.—Body of female very stout and compact, and pronouncedly compressed, with the back boldly curved; that of male, as usual, more slender and gradually attenuated behind. Head of moderate size and rather deep. Incubatory pouch large and prominent, more or less exerted at the end. Tail composed in both sexes of 4 segments, the last of which is the smallest and peculiarly produced at the end both dorsally and ventrally. Caudal rami claw-like- curved downwards, and tipped with a stout spine accompanied by a number of smaller denticles. Anterior antennæ comparatively short and stout, with the number of joints somewhat reduced; those in male not transformed. Posterior antennæ quite smooth, terminating in a well developed claw. Oral parts on the whole built on the same type as in the preceding genus. The 4 anterior pairs of legs not adapted for swimming, both rami 3-articulate and rather unequal, the outer one being the larger, and having the setæ more or less obliterated. Last pair of legs resembling in shape those in *Doropygus*.

*Remarks*.—This genus is established to include the *Doropygus gibber* of Thorell. The generic difference of this form from *Doropygus* was indeed recognised by Giesbrecht; but I am not prepared to consent with him in referring this species to the genus *Notopterophorus* Costa, as it differs very conspicuously not only in the character from which that genus has derived its name, but also in some of the structural details, as seen from the diagnoses here given of the 2 genera. The genus *Goniodelphys* of Buchholtz seems to come very near to the present genus, and should perhaps be united with it.

### 14. **Pachypygus gibber**, (Thorell).

(Pl. XXV)

*Doropygus gibber*, Thorell, l. c. p. 52, Pl. VIII, 11.

*Specific Characters*.—*Female*. Body of a very robust and compact appearance, and strongly curved ventrally, with the back boldly arched and the tail more or less bent below the anterior division. Head comparatively short, but rather deep, and produced in front to a short and obtuse rostral prominence. The 3 succeeding segments rapidly increasing in size, the 3rd being exceedingly large and deep; 1st trunkal segment only visible in its dorsal part, being otherwise concealed by the adjoining segments. Incubatory pouch large and prominent, with the hind extremity somewhat deflexed and



angular at the tip, the angle being more prominent in young specimens; enclosed ova very numerous and densely accumulated. Tail not nearly attaining half the length of the anterior division, and slightly tapered distally; last segment rather short and remarkably produced at the end both dorsally and ventrally. Caudal rami of rather a peculiar appearance, forming 2 somewhat claw-like and very mobile lamellæ curving downwards, each armed at the narrowly exerted tip with a stout spine accompanied by 2 or 3 smaller denticles. Anterior antennæ comparatively short and stout, being only composed of 7 joints clothed with rather small curved setæ, the first 2 joints very large and expanded, occupying combined  $\frac{2}{3}$  of the length of the antenna. Posterior antennæ strongly chitinised, with the terminal joint comparatively short, not even attaining the length of the middle one. Endopodal part of maxillæ with 3 somewhat unequal setæ inside the base; terminal joint extending straight outwards, and fringed on the inner edge with 4 very small setæ, at the somewhat exerted knob-like tip with 3 considerably longer setæ. Posterior maxillipeds rather fully developed, with all the joints setiferous, the last one exhibiting traces of a subdivision. 1st pair of legs with the rami nearly equal-sized, the 3 succeeding pairs however having the outer ramus considerably larger than the inner, with most of the setæ obliterated and replaced by tufts of small spinules. Last pair of legs with the distal joint cultriform, and armed on the inner edge with small denticles.

Body in the living animal of a whitish gray hue, with the ripe ova dark fuscous green.

Length of adult female attaining 5.00 mm.

*Remarks.*—This is much the largest of the known Doropygidæ, and moreover easily recognisable by its unusually robuste body. The male of this species has been well described and figured by Canu.

*Occurrence.*—I have met with this form occasionally in several places, both on the south and west coasts of Norway. It is found in several kinds of Ascidians, most frequently perhaps in *Phallusia mentula*. The mobility of the living animal is very restricted.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Norman, Scott), coast of France (Canu), Mediterranean (Buchholtz).

## Gen. 7. **Notopterophorus**, Costa, 1852.

*Generic Characters.*—Body of female strongly curved ventrally, with the free segments of trunk sharply defined and produced dorsally to more or less



prominent wing-like expansions in some instances divided into soft filiform processes; that of male simple cylindric, without any dorsal expansions. Incubatory pouch of moderate size and more or less produced at the end. Tail composed in both sexes of 4 segments, the last of which is simple, truncate at the end. Caudal rami forming 2 compressed pieces curving downwards and each armed on the narrowly truncated end with 4 subequal hooks. Anterior antennæ alike in the 2 sexes, and comparatively more slender than in *Pachypygus*. Posterior antennæ and oral parts built on a similar type to that in the said genus. The 4 anterior pairs of legs however conspicuously differing in the structure of the inner ramus, which in all the pairs is only composed of 2 joints. Last pair of legs comparatively small with the distal joint narrow linear in form.

*Remarks.*—This genus was established as early as the year 1852 by Costa, and is chiefly characterised by the peculiar wing-like expansions of the free trunkal segments in the female, these expansions attaining in some instances quite an extraordinary development. Otherwise it comes very near to the genus *Pachypygus*, yet differing from it also somewhat in the structure of the legs and that of the caudal rami. Several species of this genus have been recorded by different authors, and chiefly distinguished by the different development of the above-mentioned expansions. As however these expansions appear to be subjected to some variation, the limits between the several species are not always easy to fix exactly. Three Norwegian species referable to this genus will be described below.

# 15. *Notopterophorus auritus*, (Thorell).

(Pl. XXVI)

*Doropygus auritus*, Thorell, l. c. p. 50, ll. VII, Pl. VIII, 10.

*Specific Characters.*—*Female.* Body moderately slender and gently curved, with the free segments of trunk sharply defined by deep constrictions; wing-like expansions only slightly prominent and quite evenly rounded at the end, those of 1st segment confluent, the others well defined, though contiguous at the base anteriorly. Incubatory pouch not very large, irregularly quadrangular in outline, and terminating behind in an obtuse point. Tail about half the length of the anterior division, and slightly tapering distally, with the last segment the smallest. Caudal rami slightly curved and gradually attenuated distally, with a small bristle somewhat beyond the middle of the upper edge; tip narrowly truncated and armed with 4 hooks of equal size. Anterior an-

tennæ somewhat shorter than the head, and composed of 9 well defined joints, the first 2 of which, as usual, are the largest, though combined not much longer than the remaining part of the antenna. Posterior antennæ rather stout, with the terminal joint much shorter than the middle one; apical claw very strong. Mandibular palp with the outer ramus very short and broad, undivided. Endopodal part of maxillæ with 4 setæ inside the base, one of them much larger than the others; terminal joint fringed inside with 4 small setæ and carrying on the slightly exerted tip 3 somewhat longer setæ. Anterior maxillipeds with the terminal part rather slender, 3-articulate, middle joint considerably longer than the others. Posterior maxillipeds distinctly 3-articulate, with the last joint simple, fringed with 4 setæ. 1st pair of legs with the rami not much different in length, but rather unlike in structure, the inner ones being, as in the 3 succeeding pairs, only composed of 2 joints, the distal one much the larger and clothed with unusually long and slender setæ. Outer ramus of the 3 succeeding pairs longer than the inner and tapered distally, with the 1st joint very large, setæ much reduced, being wholly absent in the 4th pair. Last pair of legs with the distal joint narrow linear in form and provided on both edges with small spinules.

*Male* much smaller than female and without any traces of dorsal expansions.

Body of female, in the living state, of a pale yellowish brown hue, with the ripe ova fuscous green.

Length of adult female attaining 4.20 mm.; that of male scarcely exceeding 1.40 mm.

*Remarks.*—This form was described in the year 1859 by Thorell and referred by him to the genus *Doropygus*. In a note to his description he has however alluded to its apparent relationship to the genus *Notopterophorus* of Costa. Indeed, it ought evidently to be referred to that genus, though the dorsal expansions of the body are far less conspicuous than in the other known species.

*Occurrence.*—The present form is not seldom found in large Ascidiæ of different kinds. I have noted it from many places on the Norwegian coast, from the Christiania Fjord at least to the Trondhjem Fjord. Like most other Doropygidæ, it is very slow in its movements.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Norman & Scott).

16. *Notopterophorus papilio*, Hesse.

(Pl. XXVII).

*Notopterophorus papilio*, Hesse, Ann. Scienc. Nat., ser. 5, Vol. 1, p. 338, Pl. XI, figs. 1—13.

*Specific Characters.*—*Female.* Body comparatively more slender than in the preceding species and generally more strongly curved, being moreover highly distinguished by the extraordinary development of the wing-like expansions, which are very delicate, hyaline, and divided at the end into soft threadlike processes. The number of these expansions is 6 in all, the 4 middle ones being arranged in pairs on the 2nd and 3rd trunkal segments, the other 2 forming median plates issuing the one from the 1st trunkal segment, the other from the end of the incubatory pouch. Both these median expansions are somewhat spatulate in form and divided at the end into 3 threadlike processes, whereas only 2 such processes occur on each of the paired expansions. Structure of the caudal rami and of the several limbs almost exactly as in the preceding species.

*Male* of very small size, and exhibiting an appearance rather unlike that in female, being wholly devoid of any dorsal expansions, and resembling in shape the males of most other Doropygids.

Body of female, in the living state, semipellucid, of a light yellowish gray hue, with the ovarian tubes and the ripe ova dark fuscous in colour.

Length of adult female attaining 4.30 mm.; that of male scarcely exceeding 1.20 mm.

*Remarks.*—The present species exhibits a most peculiar appearance by the strongly prominent wing-like expansions surrounding the back of the body and extending in different directions. Some variability of these expansions may however be found to occur, and in younger specimens they are, as a rule, much smaller than in fully adults, though always, unlike what is the case in *N. auritus* and *elongatus*, distinctly divided at the end into well-marked thread-like processes.

*Occurrence.*—I have only met with this remarkable form in a single locality, viz., at Moldøen, west coast of Norway. It was found occasionally in the branchial cavity of large specimens of *Phallusia mentula*. Most of the specimens obtained were of the female sex; but on a closer examination of the collected material, also some few male specimens were detected, one of them still attached to the back of a young female by the aid of his rather powerfully developed posterior antennæ.

*Distribution.*—Coast of France (Hesse), British Isles (Brady).



17. *Notopterophorus micropterus*, G. O. Sars, n. sp.

(Pl. XXVIII. 1.)

*Specific Characters.*—*Female.* Body comparatively more robust than in *N. papilio*, and more resembling in shape that of *N. auritus*, being gently curved, with the segments very sharply marked off from each other. Wing-like expansions much reduced in size and conspicuously differing in shape from those in both the said species. The foremost expansion, issuing from the 1st trunkal segment, very slight, hood-like, with the edge entire, the 4 succeeding ones each exerted behind in a single thread-like point, the hindmost expansion, issuing from the end of the incubatory pouch, likewise simple, being exerted to a narrow point somewhat curved downwards. Structure of the several appendages scarcely differing from that in the 2 preceding species.

Colour of the living animal not yet ascertained.

Length of adult female 4.10 mm.

*Remarks.*—Though this form looks very different from *N. papilio*, as described and figured here, I am by no means fully convinced on its real specific validity, and indeed I do not regard it as impossible, that on a closer investigation it might turn out to represent only a peculiar variety of that species. As I however have not found any decided transition between them, I have found it advisable provisionally to record it as a separate species.

*Occurrence.*—Two female specimens only of this form have as yet come under my notice. They were obtained in the same locality as the preceding species.

Gen. 8. *Gunentophorus*, Costa, 1843.

*Syn.*: *Sphæronotus*, Claus.

*Generic Characters.*—Trunkal part of the body in female greatly inflated, with the segments partly confluent, to form the large and prominent incubatory pouch, the cavity of which is prolonged anteriorly over the 2nd and 3rd segments. Head procumbent and well defined from the 1st trunkal segment, terminating in a blunt rostral prominence. Tail nearly straight and only composed of 3 distinctly defined segments. Caudal rami curved outwards and armed at the tip with small denticles. Anterior antennæ very short and compressed, with the joints imperfectly defined. Posterior antennæ distinctly prehensile. Mandibles well developed. Maxillæ with the endopodal part transversally truncated and without any terminal joint. Posterior maxillipeds much reduced, unarticulate.



1st pair of legs very unlike the others and closely applied to the oral parts, both rami 3-articulate and provided with long plumose setæ. The 3 succeeding pairs of legs apparently immobile and without any armature whatever; outer ramus elongate, 3-articulate, inner very small and peculiarly contorted. 5th pair of legs apparently absent.

*Remarks.*—This is a very anomalous genus, exhibiting some rather extraneous characters. Yet in some respects, and more particularly in the peculiar composition of the incubatory pouch, it shows an unmistakable relationship to the genus *Bonnierilla* Canu, which is a true member of the present family. The genus as yet only comprises a single species, to be described below.

### 18. *Gunentophorus globularis*, Costa.

(Pl. XXVIII, 2)

*Gunentophorus globularis*, Costa, Fauna del regno di Napoli. Entomostraca, Pl. II.

*Syn.*: *Sphæronotus* Thorelli, Claus.

*Specific Characters.*—*Female.* Body comparatively rather robuste, with the anterior division distinctly curved, the posterior straight. Head not very deep, with the lateral edges scarcely at all curved, and terminating in front in an obtuse corner. 1st trunkal segment short and narrow; the 3 succeeding segments wholly confluent dorsally, to form the greatly prominent, almost hemispherical incubatory pouch; last trunkal segment well defined in its posterior part. Tail considerably exceeding half the length of the anterior division, and cylindric in form, though slightly tapered distally, 1st segment much the largest and a little protuberant below at the base, last segment exhibiting dorsally, somewhat beyond the middle, a slight transverse suture indicating a subdivision of the segment. Caudal rami comparatively small, slightly tapered, and abruptly bent outwards, being armed on the tip with a few very small denticles and on the outer edge, at some distance from the end, with a minute bristle. Eye imperfectly developed, without any lenses, and only represented by an irregular patch of a light yellowish red pigment. Anterior antennæ very short and stout, subtriangular in outline, and only clothed with a few very small bristles, joints imperfectly defined and apparently 6 or 7 in number. Posterior antennæ strongly chitinated and rather powerful, with the terminal joint comparatively short and somewhat tapered distally, apical claw well developed. Mandibular palp with the inner ramus shorter than the outer and less perfectly subdivided. Maxillæ with 4 short, but densely plumose setæ

on the transversely truncated end of the endopodal part. Anterior maxillipeds with the terminal part very short, uniarticulate. Posterior maxillipeds forming each an oval undivided lamella clothed inside and at the tip with a number of thickish plumose setæ. 1st pair of legs with the rami of about equal size, the outer one exhibiting only very slight traces of spines outside, its terminal joint of a somewhat irregular shape, being expanded, inside the insertions of the setæ, to a rounded lobe edged with 3 short denticles. The 3 succeeding pairs of legs much longer than the 1st, and of a very different structure, being apparently quite immobile, as only very slight traces of muscular bands are detected within them; outer ramus considerably produced and conically tapered, inner one extremely small, being composed of a short basal joint followed by a narrow, peculiarly twisted terminal piece, which in the 4th pair is simple, but in the 2 preceding pairs divided by 2 successive circular crests as it were in 3 joints. Of a 5th pair of legs not the slightest trace could be detected in the specimens examined.

Body in the living animal of a pale yellowish grey colour, with a slight bluish tinge; ovarial tubes and ripe ova of a somewhat darker violaceous hue.

Length of adult female attaining nearly 5 mm.

*Male* unknown.

*Remarks.* The present form is easily recognisable from any of the other Doropygidæ, both as regards its outward appearance and the structure of the several appendages. The large size of the Norwegian specimens is very remarkable, and could lead to the suggestion that they belonged to a species different from that observed in the Mediterranean and on the French coast.<sup>1)</sup> As however no other reliable difference could be detected to distinguish the Norwegian form, I have not felt justified to separate it specifically. The *Sphæronotus Thorelli* of Claus is evidently identical with Costa's species.

*Occurrence.*—Some few female specimens of this remarkable form were obtained, many years ago, from large specimens of *Phallusia mentula* taken in the upper part of the Trondhjem Fjord.

*Distribution.*—Mediterranean (Costa), coast of France (Canu), coast of Bohuslän (Aurivillius).

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<sup>1)</sup> Canu gives the length of the body to only 2.50 mm.

Gen. 9. **Botachus**, Thorell, 1859.

*Generic Characters*.—Body of female narrow, sub-cylindrical in shape, with the matrical part remarkably elongate and the incubatory pouch only slightly prominent. Tail short, deflexed, and composed of 4 segments, the last of which is very short and conspicuously produced ventrally. Caudal rami short, lamelliform, and armed at the end with strong claw-like spines. Anterior antennæ comparatively slender, attenuated, and rather densely clothed with setæ. Posterior antennæ with a well developed plumose seta outside the basal part, apical claw rather strong. Mandibular palp with the inner ramus undivided, outer one narrow, sabre-like. Endopodal part of maxillæ with a well defined terminal joint. Anterior maxillipeds with the terminal part well developed, 3-articulate. Posterior maxillipeds small, uniarticulate. The 4 anterior pairs of legs comparatively slender, but not adapted for swimming, both rami 3-articulate, the outer one armed at the tip and outside with very slender spines, setæ on both rami much reduced in number. Last pair of legs very small and rudimentary, resembling somewhat in structure those in the *Notodelphyidæ*.

*Remarks*.—This is also a very distinct genus, though somewhat less anomalous than *Gunenterophorus*, and more agreeing with the usual Doropygian type. In addition to the typical form described below, another nearly allied species has been recorded by Buchholtz from the Mediterranean under the name of *B. fusiformis*.

19. **Botachus cylindratus**, Thorell.

*Botachus cylindratus*, Thorell, l. c. p. 55, Pl. IX, 12.

*Specific Characters*.—*Female*. Body extremely slender and narrow, with the anterior division very little dilated and somewhat tapered anteriorly. Head gradually contracted in front and terminating in a nearly horizontal, obtusely rounded rostral plate. 1st trunkal segment very small and partly concealed by the rounded lateral corner of the head. The 2 succeeding segments well defined and slightly increasing in size behind. Matrical part of body, composed of the last 2 coalesced trunkal segments, almost occupying half the length of the body, and of oblong form, with the dorsal face only slightly vaulted and encompassing the comparatively narrow incubatory cavity. Tail very short, scarcely attaining in length  $\frac{1}{3}$  of the anterior division, and more or less abruptly bent downwards; last segment very small, but produced below to a rather prominent bifurcate lappet. Caudal rami forming 2 vertically placed



lamellæ of sub-quadrangular shape, and armed at the upper corner with 2 strong claw-shaped spines, lower corner produced to an acute prominence accompanied below by a slender bristle. Anterior antennæ angularly bent in the middle, and composed of 9 well defined joints, the first 3 of which are much larger than the others and have the setæ distinctly ciliated. Posterior antennæ rather strongly built and attached to the head by a short and thick basal joint, terminal joint longer than the preceding one and finely ciliated on both edges, apical claw only slightly curved and accompanied by 2 small bristles. Mandibular palp with the basal part narrower than usual, inner ramus lamelliform, undivided, outer ramus more slender and provided in its outer part with 5 setæ, the 2 outermost issuing from a small but well defined apical joint. Endopodal part of maxillæ with the terminal joint somewhat spatulate in form and provided at the end with 3 setæ. Anterior maxillipeds not particularly strong and gradually tapered distally. Posterior maxillipeds forming each an undivided oblong oval lamella clothed at the tip and inside with a number of partly ciliated setæ. The 4 anterior pairs of legs gradually somewhat increasing in length, 4th pair with the outer ramus considerably longer than the inner and having the terminal joint rather produced. Last pair of legs with the proximal joint produced outside to a conical process tipped with a slender bristle; distal joint very small and narrow, with a single apical seta.

Body in the living animal rather pellucid, of a whitish grey hue with the rather large ripe ova dark bluish or purplish.

Length of adult female 2.10 mm.

*Male* unknown.

*Remarks.*—The present form is at once distinguished from any of the other known Doropygidæ by its very slender and narrow body, the short and abruptly bent tail, and the shape of the incubatory pouch.

*Occurrence.*—I have met with this form not unfrequently in several places on the Norwegian coast. It is found in several kinds of Ascidians and, as observed by Thorell, almost exclusively between the lamellæ of the branchial sac, more or less firmly attached to these lamellæ by the aid of its powerful posterior antennæ. When loosened from its hold, the animal rests nearly motionless on the bottom, only a slight bending of the body being perceptible.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Brady).

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### Fam. 3. Buproridæ.

*Remarks.*—This very distinct family, established by Thorell, only comprises as yet a single genus, the characters of which are given below.

#### Gen. 10. **Buprorus**, Thorell, 1859.

*Generic Characters.*—Body short and stout, unsegmented, and only composed of head and trunk, the tail being wholly obliterated or only present as a trifling rudiment. Ripe ova received into a roomy incubatory cavity formed by the dorsal and lateral walls of the trunk in almost its entire extent, Anterior antennæ short and stout, with the number of joints much reduced. Posterior antennæ not prehensile, the terminal joint being only provided with simple spines, none of which is unguiform. Oral parts of rather simple structure, though apparently well adapted for mastication. The 4 anterior pairs of legs poorly developed, with the rami short and stout, armed at the end with short spines, the outer one biarticulate, the inner one uniarticulate. Last pair of legs forming 2 simple conical prominences tipped with a few small spines.

*Remarks.*—This genus exhibits some very extraneous characters, by which it seems to distinguish itself very sharply from any of the other genera comprised within the present division of Copepoda, and Thorell was certainly quite right in regarding it as the type of a very distinct family. He was indeed of opinion that this family was even more distinct than his family *Ascidicolidæ*, which latter he merely regarded as a subfamily of the *Notodelphyidæ*. Yet, on a closer examination, it will be found, that the present genus agrees with those treated of in the preceding pages at least in one very essential character, viz., in the presence of an incubatory cavity for the reception of the ripe ova. Such a cavity, on the other hand, does not exist either in the *Ascidicolidæ* or in the other families treated of in the sequel, the ova pured out from the ovarial tubes being here, as in most other Copepoda, accumulated in free ovisacs appended to the body. The reception of the genus *Enterocola* within the family *Buproridæ*, as proposed by Brady, cannot therefore by any means be admitted. The present genus as yet only comprises a single species, to be described below.

20. *Buprorus Lovéni*, Thorell.

(Pl. XXX)

*Buprorus Lovéni*, Thorell, l. c. p. 63, Pl. X, 14.

*Specific Characters.—Female.* Body short and stout, bag-like, with the head subquadrate in form and somewhat exerted, not being however distinctly defined behind, rostral prominence short and obtuse at the tip. Trunk with the dorsal face rather strongly vaulted and almost gibbously prominent in front, seen dorsally, regularly oval or elliptical in outline. Eye woolly absent. Anterior antennæ about the length of the head, somewhat curved, and composed of only 3 distinctly defined joints clothed with comparatively short, partly spiniform setæ, middle joint much the largest, terminal joint abruptly much narrower and scarcely  $\frac{1}{3}$  as long. Posterior antennæ 3-articulate, with the 1st joint about the length of the other 2 combined, and provided near the end anteriorly with a curved seta, the 2 outer joints firmly connected and forming with the 1st one a geniculate bend; middle joint armed outside with 3 strong spines, the outermost being accompanied by a slender seta; terminal joint shorter than the middle one and armed on the transversely truncated extremity with 3 unequal spines and a simple seta. Mandibles with the masticatory part not much expanded, but divided at the end into several sharply pointed teeth; palp quite rudimentary, being replaced by a single slender seta. Maxillæ with the masticatory lobe well developed and armed with strong spines, palp undivided, with 2 coarse spines at the tip and 2 juxtaposed setæ attached to a distinct ledge of the outer edge. Anterior maxillipeds composed of 3 joints, the 1st of which is rather large and broad, being provided at the end inside with a narrow cylindrical lobe tipped with 2 slender spines; 2nd joint produced inside to a quite similar bispinose lobe, 3rd joint very small and armed with 3 spines. Posterior maxillipeds undivided, lamellar, and fringed inside in its outer half with 4 spines, each terminating in a blunt point. The 4 anterior pairs of legs of essentially same structure, outer ramus somewhat larger than the inner one and having a short spine outside the 1st joint, distal joint obliquely truncated and fringed at the end with a row of 5 stout spines, inside which another row of somewhat more slender spines is seen, the number of these spines varying in the different legs; inner ramus in all the pairs provided at the end with 5 spines, one of which is attached to the outer edge near the tip. Last pair of legs imperfectly defined at the base, and armed at the narrowly exerted extremity with 4 short spines. Between these latter legs a small triangular prominence occurs con-

taining the anal orifice, and apparently representing a trifling rudiment of the tail.

Body in the living animal of an uniform whitish colour, with the rather large ova, contained within the incubatory cavity, of same colour, but more opaque.

Length of adult female 1.10 mm.

*Male* unknown.

*Remarks.*—The above-described peculiar form looks so very different from any of the other known Copepoda, that at the first sight even its reference to that order of Crustacea could be questioned. Indeed, in its outward appearance it more resembles some kinds of *mites*, especially the *Tardigrada*. On a closer examination however it is soon proved to be a true member of the present division of Copepoda, its extraneous appearance being the result of a close adaption to its sedentary life within Ascidians.

*Occurrence.*—I have found this peculiar form, often in considerable number, within the branchial cavity of different kinds of Ascidians, most frequently in *Phallusia obliqua*. It may however easily escape attention, on account of its small size and inconspicuous colour. The mobility of the animal is almost wholly lost, and the only token of life perceptible is a slight fumbling movement of the antennæ and legs. I have carefully looked over the numerous specimens collected, but have not succeeded in detecting even a single male among them.

*Distribution.*—Coast of Bohuslän (Thorell).

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## Fam. 4. Ascidicolidæ.

*Remarks.*—This family was established by Thorell, to include his genus *Ascidicola*, which indeed exhibits several well marked peculiarities distinguishing it very conspicuously from the other Notodelphyoida. As to the relation of this family to the other known families of the present division of Copepoda, it is evidently more sharply defined from the preceding families than from those treated of farther below, agreeing with the latter in one very essential character not recognised by Thorell, viz., in the absolute absence of any true incubatory cavity for the reception of the ripe ova. As the family only contains a single genus, it may suffice to give the characters of the latter.



Gen. 11. **Ascidicola**, Thorell, 1859.*Syn.*: Coeliacola, Hesse.

*Generic Characters.*—Body of female slender, vermiform, with no sharp demarcation between the anterior and posterior divisions. Head well defined from trunk and terminating in a broad rostral plate. The last 2 trunkal segments in female not coalesced. Tail composed in both sexes of 4 segments. Caudal rami simple, not clawed at the end. Anterior antennæ short and thick, alike in both sexes. Posterior antennæ more slender and distinctly prehensile. Oral parts poorly developed and rather differing in structure from those in the other Notodelphyoida. The 4 anterior pairs of legs in female only adapted for crawling, the rami being very short, biarticulate, the inner one armed at the end with exceedingly long and slender spines; those in male of quite normal appearance and well adapted for swimming. Last pair of legs in female transformed to large lamellæ encompassing the genital region of the body, those in male very small and rudimentary. Ripe ova accumulated in 2 juxtaposed ovisacs appended to the dorsal face of the body and arched over by the transformed last pair of legs.

*Remarks.*—The present genus comprises as yet only a single species, to be described below.

21. **Ascidicola rosea**, Thorell.

(Pl. XXXI)

*Ascidicola rosea*, Thorell, l. c. p. 59, Pl. IX & X, 13.*Syn.*: Coeliacola setigera, Hesse.

*Specific Characters.*—*Female.* Body almost perfectly cylindrical in form, the anterior division being very little broader than the posterior. Head slightly contracted in front, and terminating in a broadly rounded rostral plate. The first 2 trunkal segments imperfectly separated, the 2 succeeding ones however well defined. Last trunkal segment not clearly defined from the 1st caudal segment, both having the dorsal face somewhat hollowed to make an underlayer for the ovisacs. Tail very fully developed, exceeding in length the anterior division, and composed of 4 well defined segments gradually somewhat diminishing in size, the penultimate one having the ventral part of the hind edge remarkably thickened and densely clothed with small pricks, last segment transversely truncated at the end. Caudal rami a little shorter than the anal segment, and narrow linear in form, tip somewhat obliquely



truncated and carrying 3 spiniform setæ, the innermost but one much longer than the others, outer edge provided with a well defined seta about in the middle, and the dorsal face with another smaller seta at a short distance from the tip. Eye inconspicuous. Anterior antennæ short and thick, somewhat curved and terminating in a blunt point, each antenna composed of 6 joints densely clothed with comparatively short but rather strong curved setæ. Posterior antennæ rather broad at the base, but rapidly tapered distally, the first 2 joints each armed near the end anteriorly with a slender spine, terminal joint narrow, sublinear in form, and provided with a short spine in about the middle\* of the outer edge, tip armed with a comparatively small claw slightly curved at the end and accompanied by 2 or 3 small bristles. Anterior lip broad, almost trapezoid in form. Mandibles with the masticatory part divided at the end into several sharply pointed teeth, partly bi- or tri-partite; palp very small and apparently undivided with 3 or 4 short setæ at the tip and one considerably larger seta outside, apparently replacing the outer ramus. Maxillæ divided into 2 nearly equal triangular lobes, the inner one representing the masticatory lobe, the outer the palp, both edged with a number of partly spiniform setæ. Anterior maxillipeds only composed of 2 distinctly defined joints, the proximal one rather large and provided inside with a short lobe tipped with 2 small spines; distal joint produced at the end to a strong claw-like spine accompanied outside by another much narrower spine, its outer edge provided with 4 small bristles arranged in pairs. Posterior maxillipeds very small and closely approximate, each forming a narrow somewhat curved lamella, with 3 small setæ at the tip and 2 other similar setæ in about the middle of the outer edge. The 4 anterior pairs of legs of essentially same structure, with both rami biarticulate, the outer one somewhat incurved and without any setæ inside, but armed outside and at the tip with strong spines; inner ramus carrying on the extremity 3—4 exceedingly long and quite smooth spiniform setæ extending backwards along the median line of the belly. Last pair of legs transformed to 2 very large curved lamellæ<sup>1)</sup> encompassing the middle part of the body and completely arching over the ovisacs. The latter closely juxtaposed and of oblong oval form, reaching nearly to the end of the 1st caudal segment. Ovarial tubes very conspicuous in the living animal, and extending far into the tail.

*Male* of very small size, as compared with the female, and rather unlike it in its outward appearance, the body being somewhat depressed in its anterior

<sup>1)</sup> It is the merite of Canu to have given a right interpretation of these lamellæ, the significance of which was wholly miscomprehended by Thorell and most other authors.

part and gradually attenuated behind, with the head comparatively of larger size. Antennæ, oral parts, and caudal rami of exactly same structure as in the female. Legs however very different, the 4 anterior pairs exhibiting quite a normal structure, with both rami 3-articulate and armed in the usual manner, being all well adapted for swimming. Last pair of legs very small, knoblike.

Body of female, in the living state, of a light reddish hue, with the ovarian tubes and the ripe ova of a deep rosy colour.

Length of adult female attaining 4.10 mm., that of male only 1.20 mm.

• *Remarks.*—The present form cannot be confounded with any of the other known Notodelphyoidæ, being at once recognised by its slender vermiform body. The specimen described by Thorell as the male of this species, is quite certainly not a male, but an immature female, in which the 5th pair of legs had not yet attained its full development. The form recorded by Hesse under the name of *Coeliacola setifera* is apparently identical with the present species.

*Occurrence.*—Several female specimens of this peculiar Copepod have been collected by me at different times and in different places on the Norwegian coast. They were found in the branchial cavity of several kinds of Ascidians. Of males I have only as yet come across a single specimen, and this was not found in Ascidians, but freely among some dredged material obtained at Drøbak, upper part of the Christiania Fjord.

*Distribution.*—Coast of Bohuslän (Thorell), British Isles (Brady), coast of France (Hesse, Canu).

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## Fam. 5. Botryllophilidæ.

*General Characters.*—Body more or less distinctly segmented, with the anterior division, as a rule, much broader than the posterior. Ripe ova not received in any incubatory cavity, but accumulated to form one or 2 free ovi-sacs appended to the dorsal face of the genital segment. Tail cylindric in form, and composed of a varying number of segments in the different genera. Caudal rami armed at the extremity with strong claw-like spines. Anterior antennæ short and compressed, narrowly exerted at the end. Posterior antennæ not prehensile. Oral parts well developed, but rather different in structure from those in the preceding families. Posterior maxillipeds

exceedingly powerful, representing the chief attaching organs of the animal. The 4 anterior pairs of legs more or less reduced and; as least in female, quite unsuitable for swimming. Last pair of legs in female transformed as supports for the ovisacs.

*Remarks.*—This family is established to include 3 nearly allied genera, to be treated of in the sequel, that of the earliest date being *Botryllophilus* Hesse. The family agrees with the *Ascidicolidae* in the presence of free orisacs in the female, but differs considerably in the structure of the several appendages, the most prominent difference being the transfer of the affixing faculty to the posterior maxillipeds.

## Gen. 12. *Botryllophilus*, Hesse, 1864.

*Generic Characters.*—Anterior division of body in female very sharply marked off from the posterior and rather tumid, carrying at the end, on each side, the transformed 5th pair of legs. Tail narrow cylindric in form, and composed of 4 well defined segments. Anterior antennæ with the number of segments rather reduced. Posterior antennæ with the middle joint very short, terminal joint elongate and armed with strong spines. Mandibles with the masticatory part considerably expanded, palp biramous with the inner ramus largely developed, the outer very small. Maxillæ with the exopodal lobe obsolete. Anterior maxillipeds comparatively feeble in structure, and divided inside into a number of digitiform lobes, each tipped with a single curved spiniform seta. Posterior maxillipeds very powerfully developed, and pronouncedly prehensile, terminating in a claw-like biarticulate digit. The 4 anterior pairs of legs (in female) with the rami short, uni- or biarticulate, the outer one spiniferous, the inner setiferous. Last pair of legs in female forming 2 narrow setiferous lappets attached to the sides of the last trunkal segment and extending backwards, encompassing between them the single or double ovisac. The latter more or less globular in form.

*Remarks.*—The present genus was established as early as the year 1864 by Hesse, to include a peculiar Copepod (*B. ruber*) found by him within a compound Ascidian (*Botryllus*). Subsequently 2 forms evidently referable to the same genus were recorded, the one by Scott from the Scottish coast, the other by Canu from the French coast. Scott identified, though with some doubt, the form observed by him with Hesse's species, whereas Canu regarded his form as a new species and described it under the name of *B. macropus*. As



the original description and figures given by Hesse are very imperfect, it remains still questionable, whether the one or the other of these 2 forms should be regarded as identical with *B. ruber* Hesse. I should be inclined to believe that these 3 forms in reality represent as many distinct species. They all however agree in the peculiar shape of the transformed last pair of legs, and this is indeed one of the most conspicuous characters distinguishing the present genus from the other 2 genera treated of in the sequel. Scott has described the adult male of the species observed by him. It is about half the size of the female, and differs from it conspicuously, both as regards the general form of the body and the structure of some of the appendages. Thus the anterior antennæ are densely clothed, especially at the base, with delicate band-like setæ (æsthetascs?), and the legs are built on a quite different type, the 4 anterior pairs being apparently well adapted for swimming. A well defined new species referable to the present genus will be described below.

22. *Botryllophilus brevipes*, G. O. Sars, n. sp.  
(Pl. XXXIII)

*Specific Characters.*—*Female.* Body comparatively short and stout, with the anterior division oblong oval in form, and having all the segments confluent, no traces of any dividing sutures being observable. Cephalic part defined from the trunk above by a very slight depression, and gradually contracted anteriorly, being produced in front to a very small, abruptly deflexed rostral prominence. Dorsal face of trunk gently vaulted and abruptly curved behind. Tail considerably exceeding half the length of the anterior division, and perfectly straight; 1st segment much the largest and rather tumid in its proximal part; anal segment somewhat longer than the preceding one. Caudal rami short and somewhat curved outwards, being armed at the extremity with 4 strong curved claws. Eye imperfectly developed, though easily observable in the living animal. Anterior antennæ short and compressed, very broad at the base, but rapidly tapered distally, being composed of only 4 joints sharply defined from each other, and clothed with a few rigid setæ issuing from knob-like prominences of the edge. Posterior antennæ a little longer than the anterior and abruptly bent in the middle, 1st joint fully as long as the other 2 combined and perfectly smooth; terminal joint linear in form and armed on the outer edge with 2 strong spines, the obtusely rounded extremity of the joint carrying 3 somewhat smaller spines followed by 2 slender setæ. Mandibles with the outermost tooth of the cutting edge distinctly bifurcate, palp rather

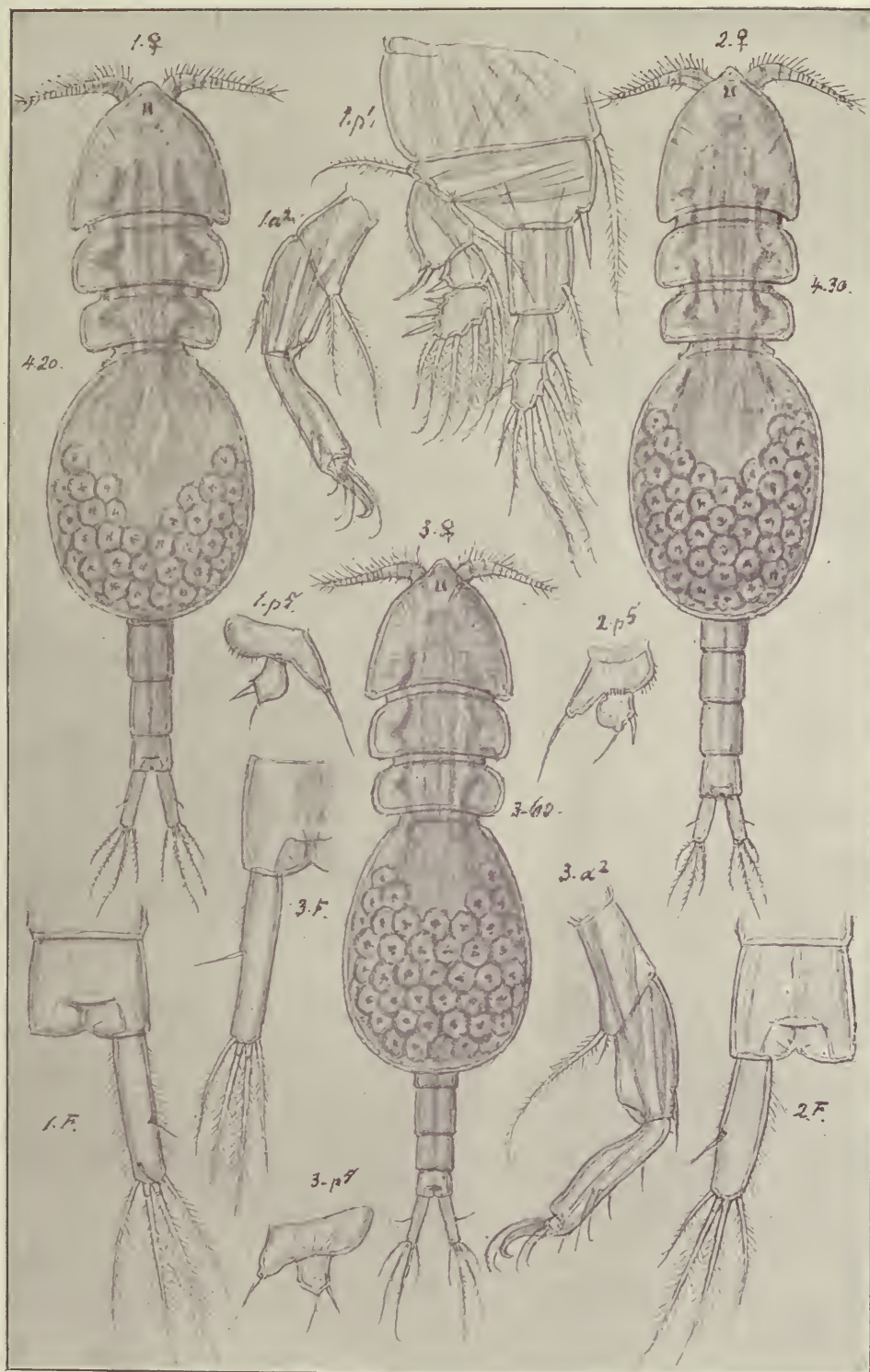


# Copepoda

Notodelphyidæ

Notodelphyoida

Pl. XVII



G. O. Sars del.

1. *Notodelphys rufescens*, Thorell
2. „ *cærulæa*, Thorell
3. „ *agilis*, Thorell

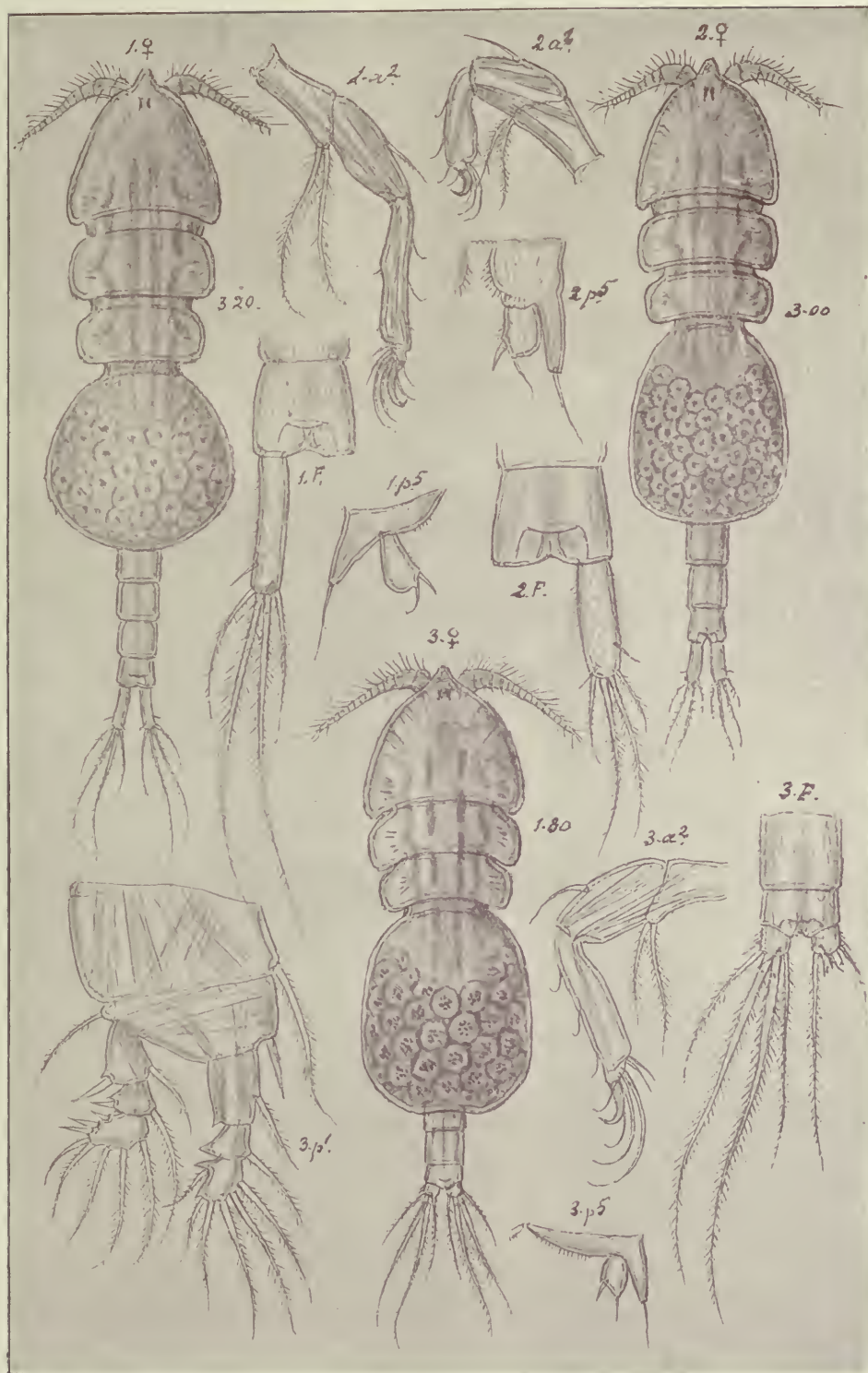


# Copepoda

Notodelphyidæ

Notodelphyoida

Pl. XVIII



G. O. Sars del.

1. *Notodelphys tenera*, Thorell
2.       "       *elegans*, Thorell
3.       "       *prasina*, Thorell



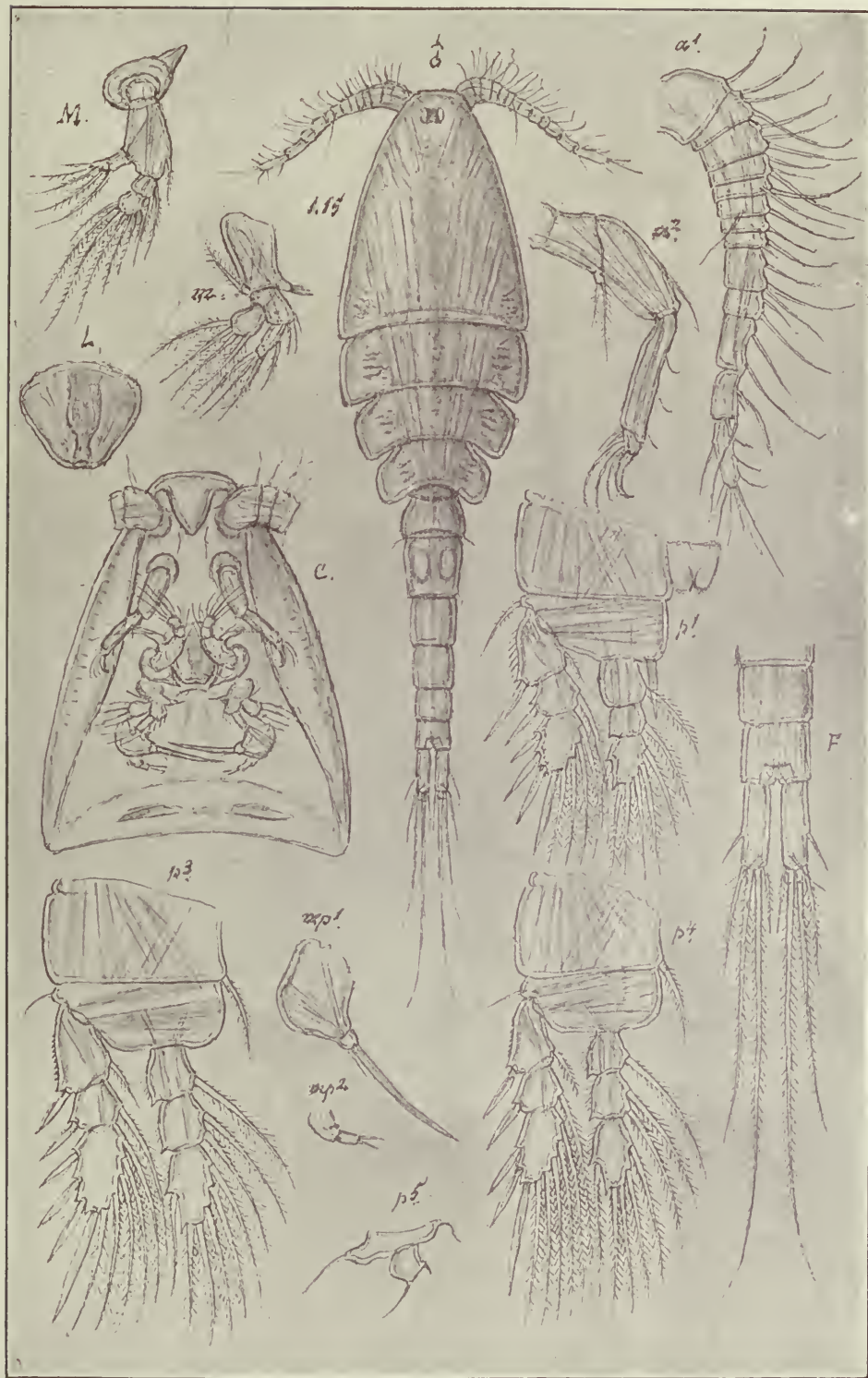


# Copepoda

Notodelphyidae

Notodelphyoida

Pl. XIX



G. O. Sars del.

*Agnathaner typicus*, Canu

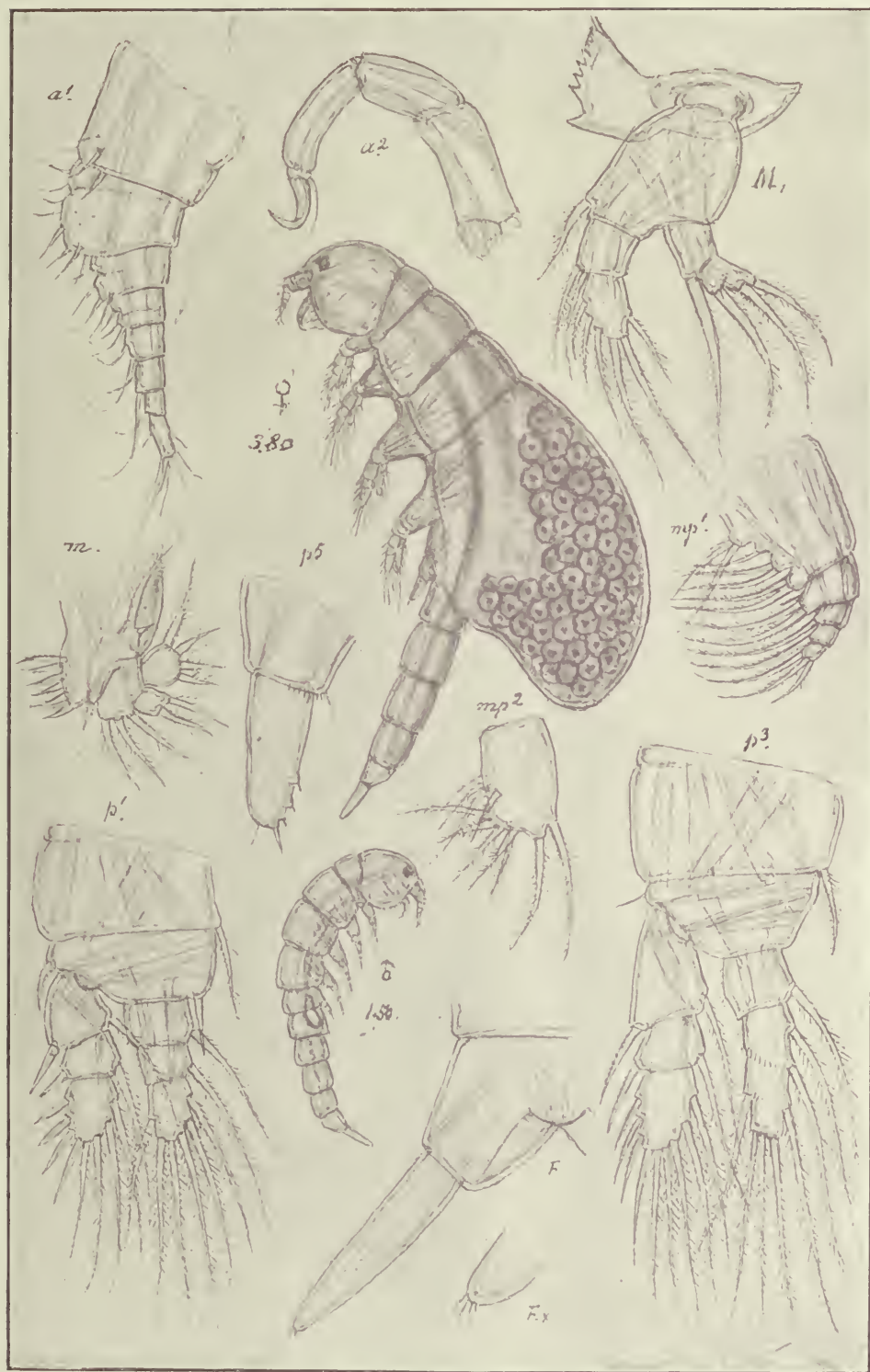


# Copepoda

## Notodelphyoidea

Doropygidae

Pl. XX



G. O. Sars del.

*Doropygus pulex*, Thorell



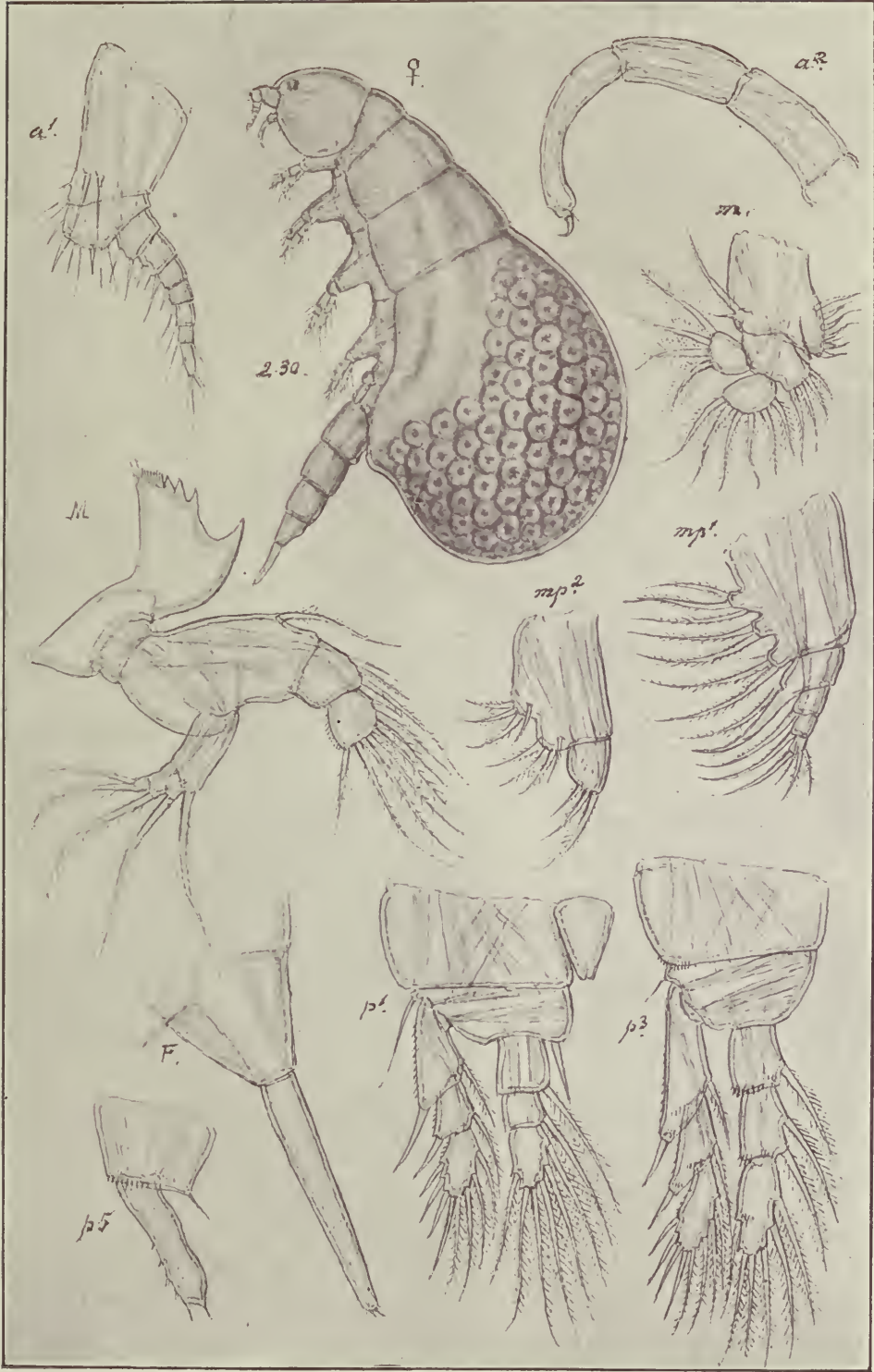


# Copepoda

Doropygidæ

Notodelphyoida

Pl. XXI



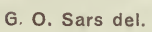
G. O. Sars del.

*Doropygus psyllus*, Thorell



## Notodelphyoida

Pl. XXII



*Doropygus porcicauda*, Brady



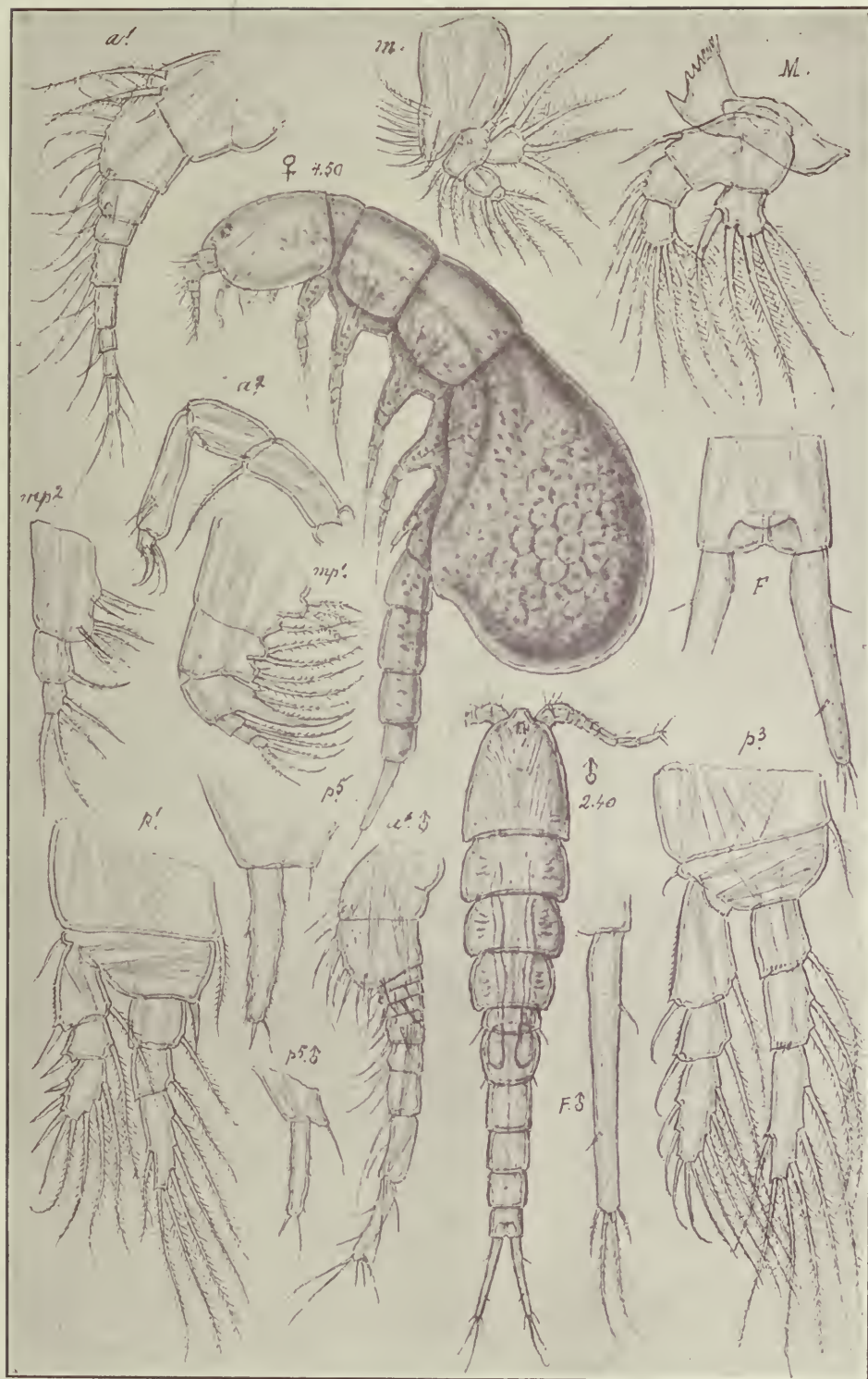


# Copepoda

Doropygidæ

Notodelphyoida

Pl. XXIII



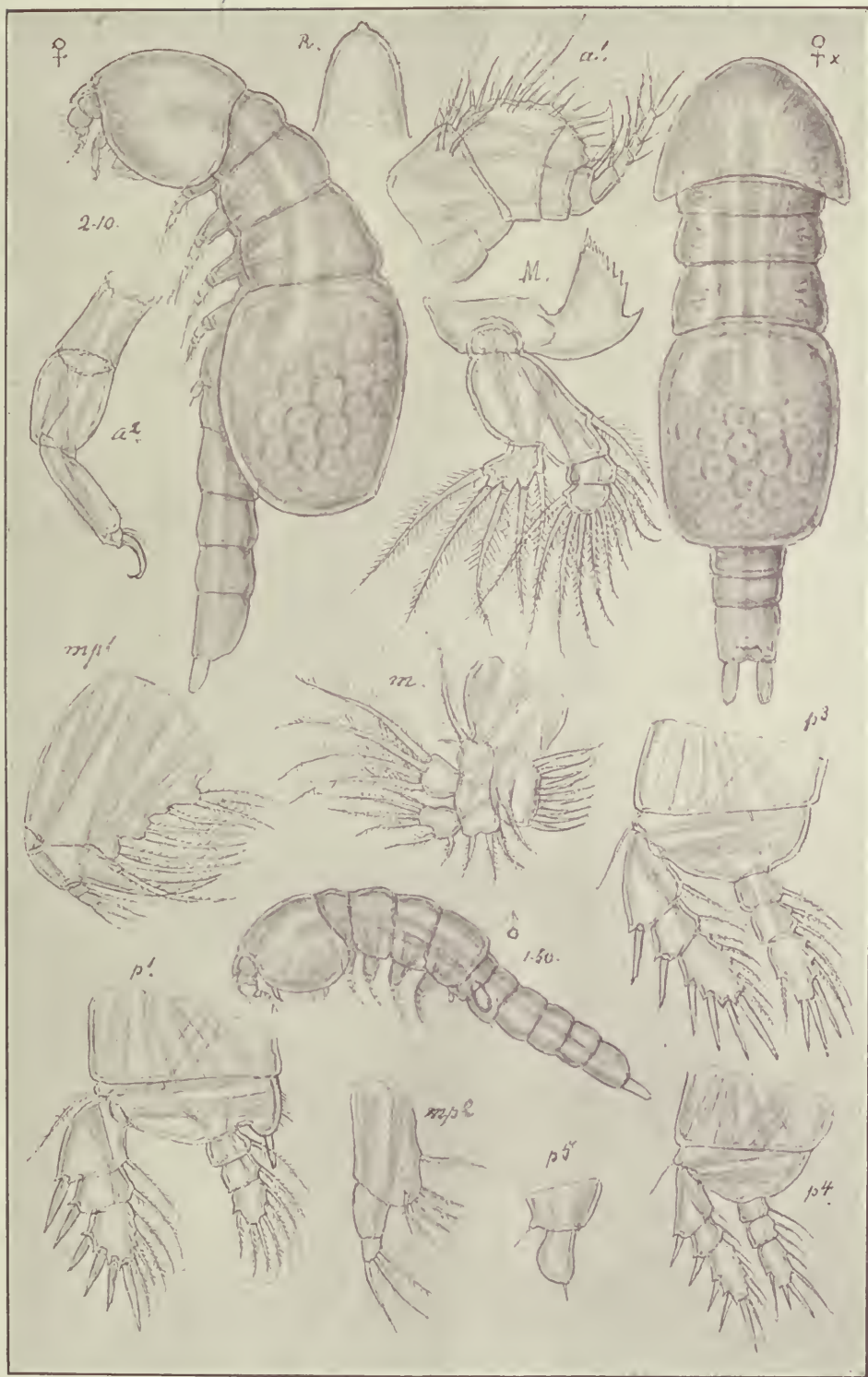
G. O. Sars del.

*Doropygopsis longicauda*, (Auriv.)



## Notodelphyoida

Pl. XXIV



Doropygella Thorelli, (Auriv.)





# Copepoda

Doropygidae

Notodelphyoida

Pl. XXV



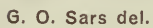
G. O. Sars del.

*Pachypygus gibber*, (Thorell)



## Notodelphyoida

Pl. XXVI



**Notopterophorus auritus, (Thorell)**



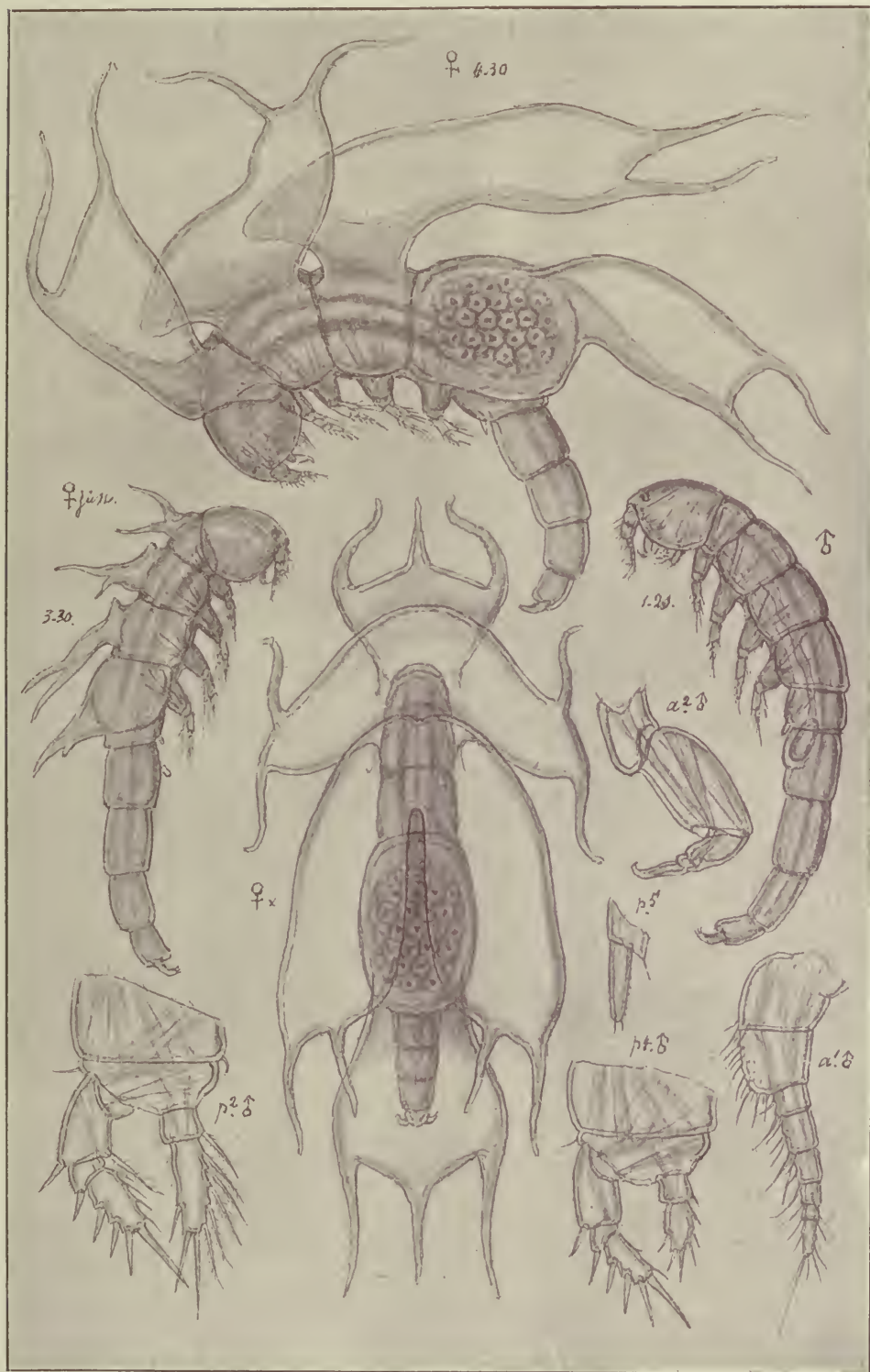


# Copepoda

Dorpygidæ

Notodelphyoida

Pl. XXVII



G. O. Sars del.

*Notopterophorus papilio*, Hesse

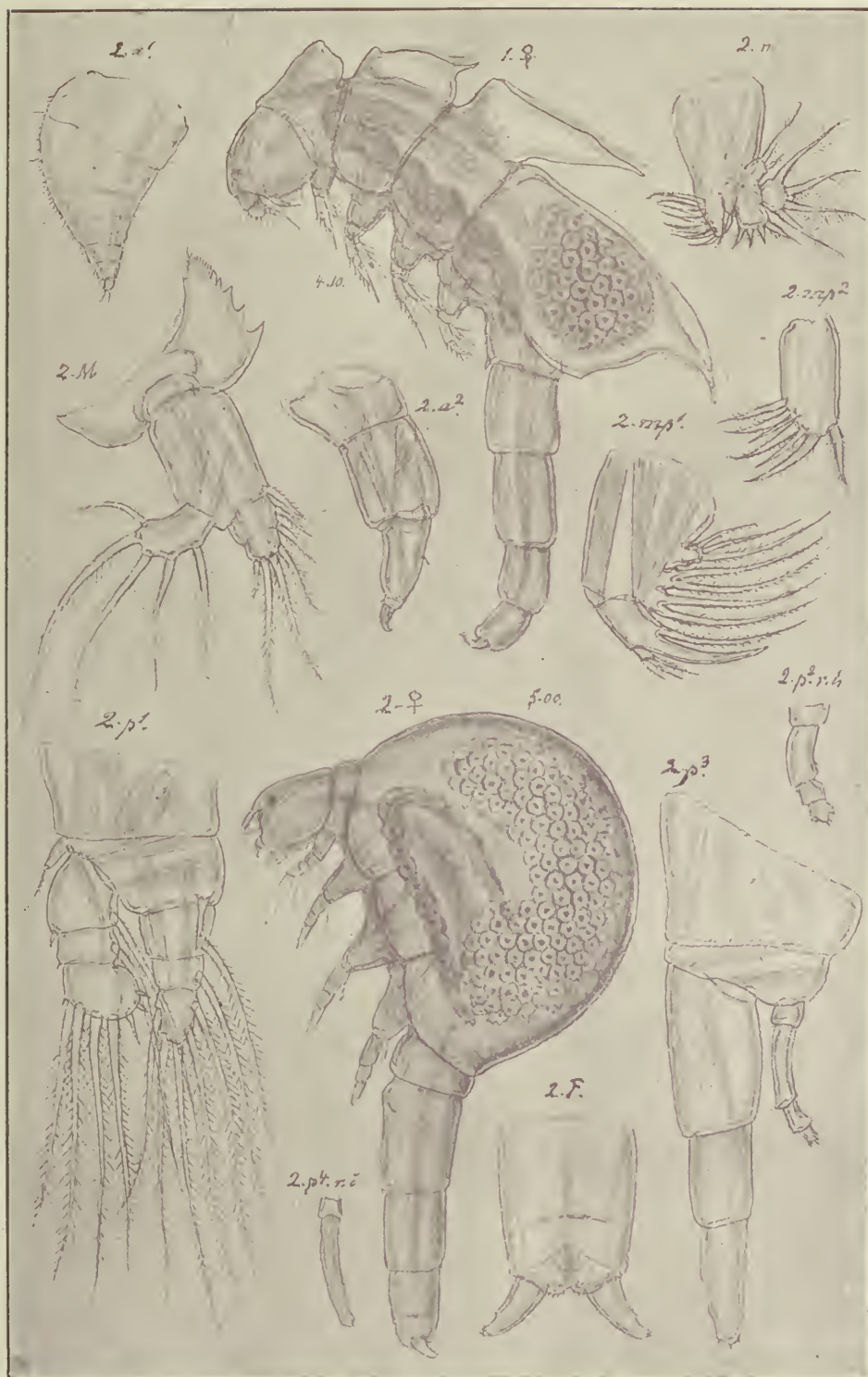


# Copepoda

Doropygidæ

Notodelphyoida

Pl. XXVIII



G. O. Sars del.

1. *Notopteropterus micropterus*, G. O. Sars
2. *Gunentophorus globularis*, Costa



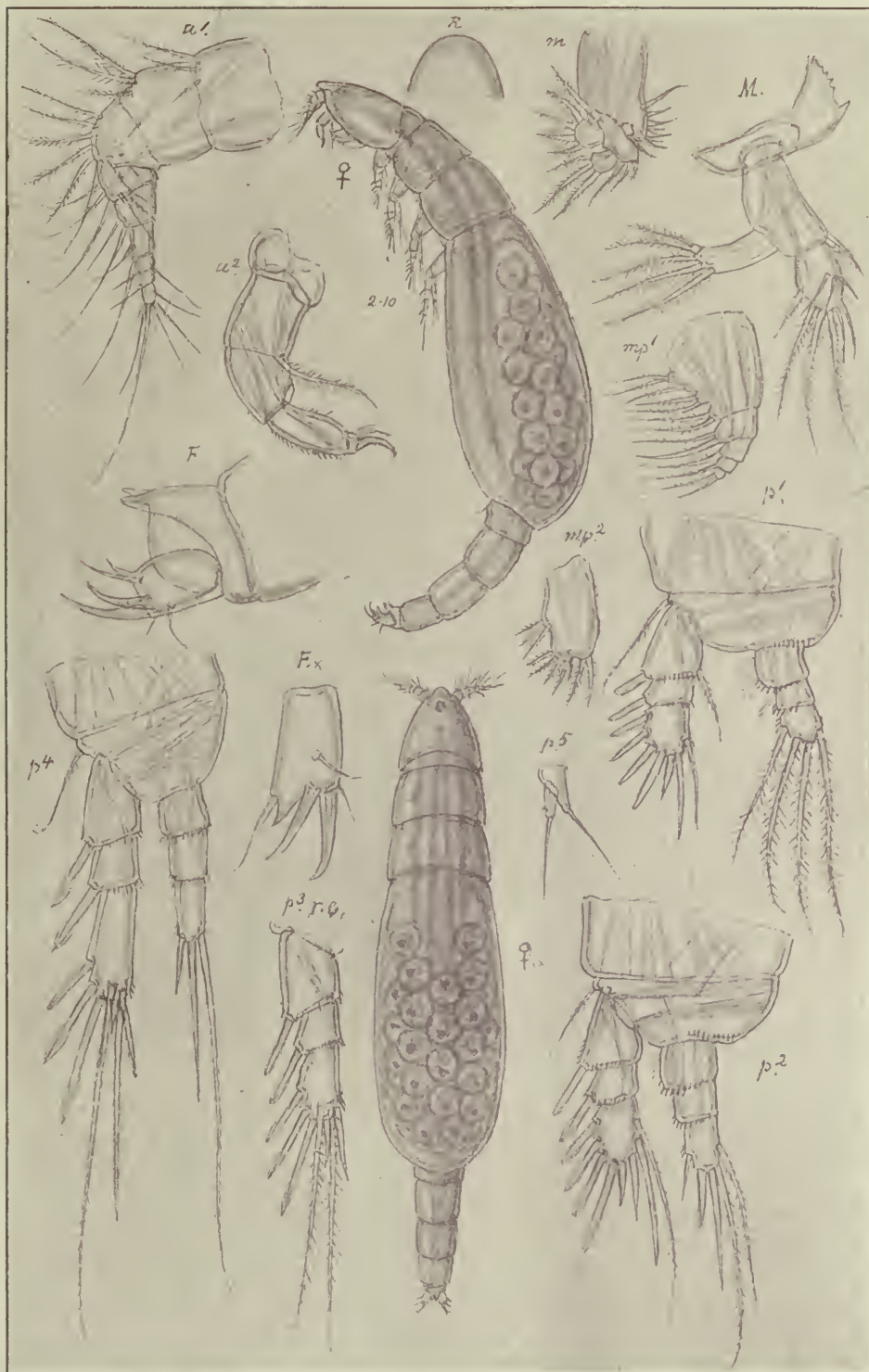


# Copepoda

Doropygidæ

Notodelphyoida

Pl. XXIX



G. O. Sars del.

*Botachus cylindratus*, Thorell

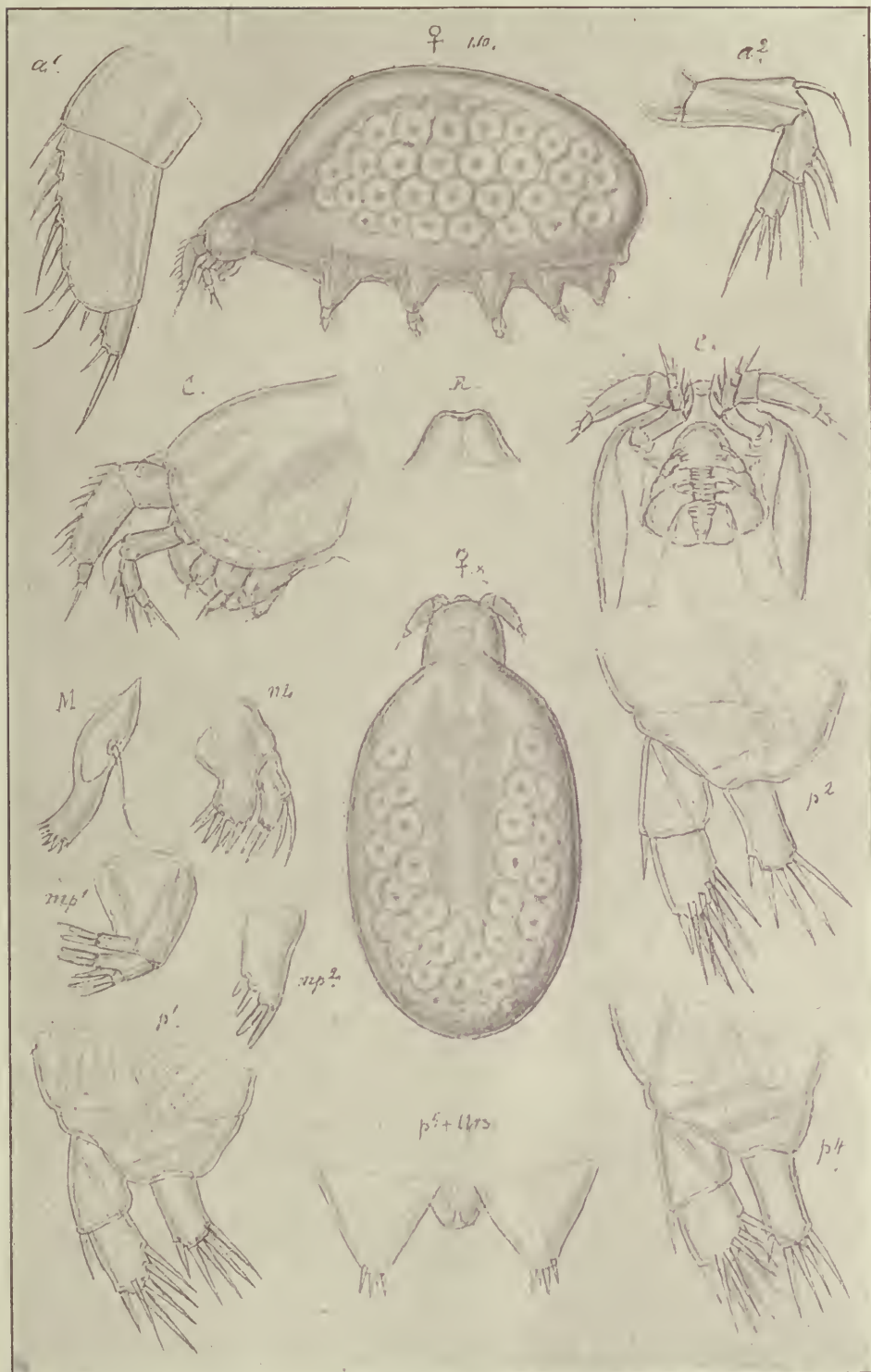


# Copepoda

Buproridæ

Notodelphyoida

Pl. XXX



G. O. Sars del.

*Buprorus Lovéni*, Thorell



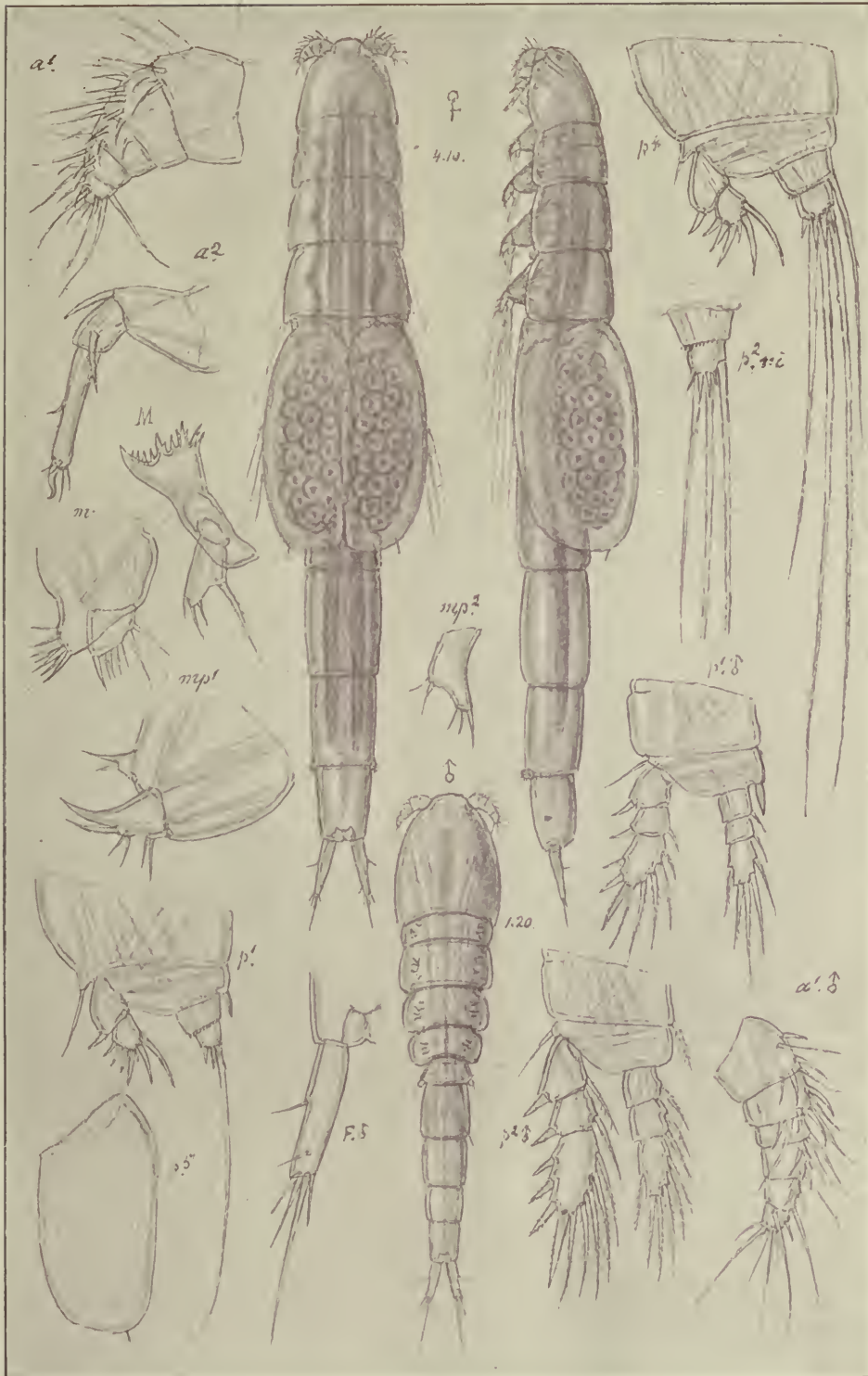


# Copepoda

Ascidicolidæ

Notodelphyoida

Pl. XXXI



G. O. Sars del.

*Ascidicola rosea*, Thorell

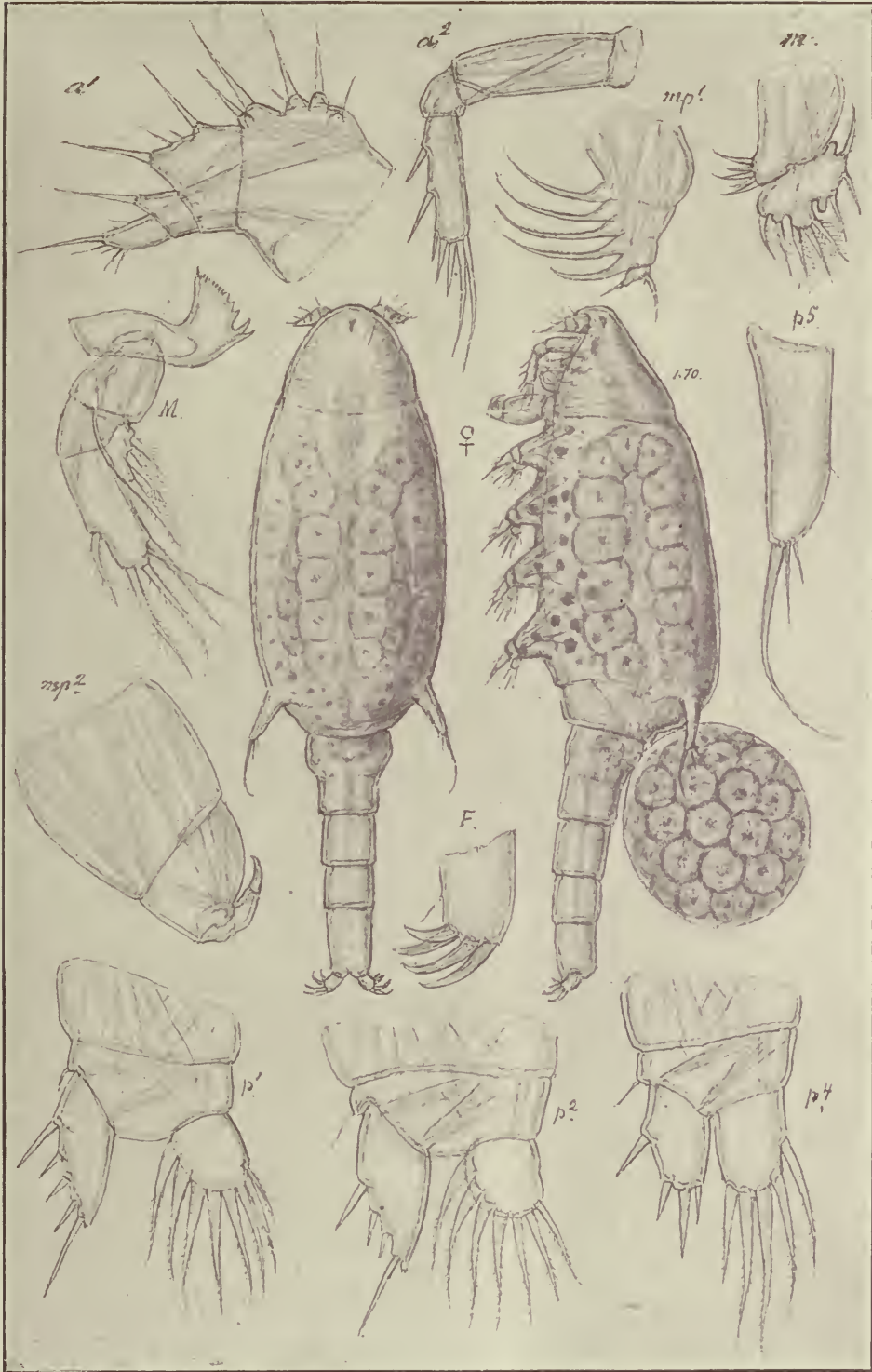


# Copepoda

Botryllophilidæ

Notodelphyoida

Pl. XXXII



G. O. Sars del.

*Botryllophilus brevipes*, G. O. Sars





large, far exceeding in length the body of the mandible, rami however of very unequal size, the inner one being much the larger and fully twice as long as the basal part, proximal joint of this ramus imperfectly defined and without any setæ, distal joint oblong oval in form, and provided with 5 coarse setæ, one of which is attached to the outer edge, the other 4 to the obtusely rounded extremity; outer ramus attached close to the base of the inner, and forming a small triangular lamella, edged with 3 plumose setæ. Maxillæ with the masticatory lobe comparatively small, with a restricted number of spines; endopodal part with 2 comparatively short setæ inside the base, terminal joint imperfectly defined and edged with 3 similar setæ; exopodal lobe obsolete and replaced by 3 short setæ attached to the outer nearly straight edge of the palp, which is produced both proximally and distally to a small knob-like prominence. Anterior maxillipeds with the basal part imperfectly subdivided, and exhibiting inside 5 digitiform lobes and as many curved setæ; terminal part small, uniarticulate, with a minute apical spine and a densely ciliated seta outside the base. Posterior maxillipeds composed each of a very large and massive basal part divided into 2 segments, and of a comparatively short, but very mobile biarticulate dactylus curved inwards. The 4 anterior pairs of legs much reduced, with both rami quite short and uniarticulate, the outer one narrow triangular in form, with the inner edge perfectly smooth, the outer armed with 5 somewhat unequal spines; inner ramus rounded oval in form and fringed with thickish, sparingly ciliated setæ, the number of which is somewhat varying in the different pairs. Last pair of legs far less produced than in the other species, and attached to the sides of the posterior part of the trunk, somewhat nearer the dorsal face; each having the form of a narrow lanceolate lappet carrying on the tip a rather strong curved seta accompanied by 2 much smaller bristles, another still smaller bristle occurring on the upper edge somewhat beyond the middle. Only a single comparatively large globular ovisac present, attached to the dorsal face of the genital segment.

Body in the living animal of a pale reddish orange hue, with the ovarial tubes and the ripe ova bright green in colour. Length of adult female 1.70 mm.

*Male* unknown.

*Remarks.*—The above-described species may be easily distinguished from any of the other forms recorded by the quite unsegmented anterior division of the body, as also by the poor development of the legs.

*Occurrence.*—Some few female specimens of this form were found, many years ago, within the body cavity of a species of *Botryllus*, taken at Espevær, west coast of Norway.

Gen. 13. **Pteropygus**, G. O. Sars, n.

*Generic Characters*.—Body (of female) perfectly segmented, with the anterior division well marked off from the posterior, but less tumid than in *Botryllophilus*. Tail much narrower than the anterior division, and only composed of 3 segments; caudal rami short, clawed at the end. Antennæ and oral parts of a structure similar to that in *Botryllophilus*. The 4 anterior pairs of legs with both rami short, uniarticulate, the outer one spiniferous, the inner setiferous. Last pair of legs transformed to 2 large wing-like lamellæ encompassing the last trunkal segment and meeting each other at the base dorsally, partly obtecting the single cake-like ovisac.

*Remarks*.—The present new genus is nearly allied to *Botryllophilus*, but differs conspicuously in the perfect segmentation of the anterior division of the body, the 3-articulate tail, and more particularly in the very unlike appearance of the last pair of legs, which are developed in a somewhat similar manner to that in the genus *Ascidicola*. The genus comprises as yet only a single species, to be described below.

23. **Pteropygus vestitus**, G. O. Sars, n. sp.  
(Pl. XXXIII).

*Specific Characters*.—*Female*. Body comparatively short and stout, with the anterior division of nearly equal width throughout, and only very slightly vaulted dorsally. Cephalic segment scarcely narrower than the succeeding segment and evenly rounded in front, rostral prominence very slight. Last trunkal segment well defined and abruptly narrowed behind. Tail about equalling in length the trunk, and narrow cylindrical in form, with its 3 segments of nearly equal size. Caudal rami turned straight outwards, and armed at the end with 4 strong curved claws arranged in pairs. Eye very small. Anterior antennæ short and compressed, broad at the base, but rapidly tapered distally, being composed of 6 well defined joints clothed in front with numerous unequal rigid setæ. Posterior antennæ very like those in *Botryllophilus*, last joint armed with 8 spines, 4 on the outer edge and 4 on the tip. Mandibles with the 2 outermost teeth of the cutting edge much larger than the others; palp very large, nearly twice the length of the body of the mandible, and of a structure very similar to that in *Botryllophilus*. Maxillæ likewise rather similar, though having the terminal joint of the palp distinctly defined at the base. Anterior maxillipeds comparatively more fully developed than in that

genus, but built on the very same type. Posterior maxillipeds large and massive, forming, as in *Botryllophilus*, the chief attaching organs. The 4 anterior pairs of legs very imperfectly developed, outer ramus cultriform, with 6 strong spines outside, inner ramus rather smaller and scarcely lamelliform, being narrowed distally, and only provided with a restricted number of setæ at the tip. Last pair of legs forming 2 broadly oval lamellæ encompassing the body like a mantle, and extending nearly to the middle of the tail, each lamella provided at the end below with a small bristle. Ovisac oval, flattened, and extending almost to the end of the tail.

Colour whitish gray.

Length of adult female 1.80 mm.

*Male* unknown.

*Remarks.*—The above-described form cannot be confounded with any of the other members of the present family. From the species of the genus *Botryllophilus* it is at once distinguished by the very different appearance of the transformed last pair of legs, in which respect it more resembles the form next to be described.

*Occurrence.*—A few female specimens only of this peculiar form have as yet come under my notice. They were taken at Risør, south coast of Norway, and, as far as I remember it, from the branchial cavity of *Phallusia obliqua*.

#### Gen. 14. *Schizoproctus*, Aurivillius, 1885.

*Generic Characters.*—Body of female fusiform in shape, with thin and soft integuments and the segments only indicated by slight constrictions; that of male more distinctly segmented and of extremely small size, as compared with the female, to the ventral face of which it is found attached. Tail apparently composed of 5 segments, and not very sharply marked off from the trunk. Caudal rami small, curving outside, and minutely clawed at the end. Antennæ and oral parts built on the same type as in the 2 preceding genera, but on the whole less fully developed. The 4 anterior pairs of legs very small, with the rami uniarticulate and nearly of equal structure, both forming small triangular pieces armed outside with short spines. Last pair of legs (in female), as in *Pteropygus*, transformed to broad lamellæ extending on each side along the base of the tail and separated dorsally by a deep and narrow cleft. Ovisac not yet observed.

*Remarks.*—This genus, established by Aurivillius, is evidently referable to the same family as the 2 preceding genera, though the outward appearance



found to exist, and it therefore may be allowed to include the present family in the same great division. Moreover in habits these forms agree with the other Notodelphyoida in so far that they are parasites of the same group of animals, viz., the Tunicata. The want of any true masticatory appendages would seem to prove, that these Copepoda do not feed on any firm particles, but only on some nourishing fluids licked up from their hosts. In so far they present an evident agreement with the *poecilostomous Cyclopoida*, from which they indeed may be assumed to have been originally derived by a close adaption to changed conditions of life, just as the other Notodelphyoida in all probability by a similar adaption have taken their origin from *gnathostomous Cyclopoida*. 3 genera referable to the present family will be treated of below. Another genus, *Enteropsis*, has been established by Aurivillius, and moreover several of the peculiar forms recorded by Hesse, as found in compound Ascidians, may in all probability be included in the same family.

### Gen. 15. **Cryptopodus**, Hesse, 1865.

*Syn.*: *Aplostoma*, Canu.

*Generic Characters*.—Body of female oblong, more or less curved ventrally, with the anterior division well marked off from the posterior and terminating behind on each side in a short rounded lobe (the transformed 5th pair of legs), the last 2 trunkal segments coalesced. Tail very small and imperfectly segmented. Posterior antennæ smaller than the anterior ones, distal joint sublinear and minutely denticulate outside. Oral aperture forming a transverse fissure limited in front by a slightly prominent bell-shaped anterior lip. Maxillæ only present as a very trifling rudiment on each side of the oral aperture. Maxillipeds comparatively small, biarticulate, and terminating in a minute hook. The 4 anterior pairs of legs very imperfectly developed, basal part not distinctly defined, rami confluent at the base, the outer one forming a simple rounded lobe, the inner knife-shaped, with a few short denticles inside. Last pair of legs having the appearance of 2 simple conical lobes projecting on each side somewhat dorsally from the last trunkal segment. Ovisacs large, cylindrical in form.

*Remarks*.—This genus was established in the year 1865 by Hesse, but very imperfectly characterised, and on that account it was not recognised by subsequent authors. I think however I am right in identifying the genus *Aplostoma* of Canu with Hesse's genus. In any case the generic name proposed by Canu cannot be supported, as it has been long ago preoccupied.



The genus is prominently characterised by the small size of the posterior antennæ and the imperfect development of the oral parts, as also by the structure of the legs. Hesse records 2 species of this genus, *C. flavus* and *viridis*, none of which seems to be identical with the 2 Norwegian species here described.

## 25. *Cryptopodus brevicauda*, (Canu)

(Pl. XXXV)

*Aplostoma brevicauda*, Canu, Copépodes de Boulonnais, p. 223, Pl. XX, figs. 5—18.

*Specific Characters.*—*Female.* Body rather slender, with the anterior division nearly cylindrical in shape, though gradually narrowed in its anterior part; limits of the segments indicated by well-marked constrictions. Cephalic segment comparatively small and less distinctly defined, terminating in front in a minute tuberculiform prominence. Tail very short, scarcely exceeding in length  $\frac{1}{8}$  of the anterior division, and only composed of 2 distinctly defined segments, the 1st rather broad at the base and rapidly tapered distally, the 2nd very small. Caudal rami somewhat divergent, each with a minute bristle in the middle of the outer edge and another still smaller one at the apex. Anterior antennæ conical in form and apparently composed of 4 joints, the outer 3 quite short and clothed with small bristles. Posterior antennæ much smaller than the anterior, with the distal joint narrow linear in form and armed outside with 4 minute denticles. Anterior lip with the hind edge quite smooth. Ovisacs fully as long as the entire body, cylindrical in form, and more or less twisted.

Body of the living animal rather opaque, of a pale rosy colour, with the ovarial tubes of a somewhat darker hue.

Length of adult female 2.50 mm.

*Remarks.*—The above-described form is unquestionably identical with that recorded by Canu as the type of his genus *Aplostoma*. Canu has also observed the male of this species, and has given good figures of it in the above-quoted work.

*Occurrence.*—Some few female specimens of this peculiar Copepod were taken, many years ago, at Espevær, west coast of Norway. They were found in the compound Ascidian, *Polyclinum luteum*, lying within a diverticle of the branchial sac of the Zooids.

*Distribution.*—Coast of France (Canu).

26. *Cryptopodus eruca*, (Norman).

(Pl. XXXV, 2)

*Enterocola eruca*, Norman, Last Shetland dredging Report, p. 300.

*Specific Characters.*—*Female.* Body resembling in shape that of the preceding species, but (in the specimens observed) more strongly curved and with the constrictions between the segments deeper. Tail comparatively still smaller than in *C. brevicauda*, with the caudal rami much shorter and without any bristles. Anterior antennæ apparently only composed of 3 joints. Posterior antennæ comparatively stouter than in that species, with the distal joint coarser and only armed with 3 short denticles outside. Anterior lip with the posterior edge divided into 6 very conspicuous tooth-like processes, 2 mediate and 2 on each side near the outer corner. The other appendages scarcely differing in structure from those in *C. brevicauda*. Ovisacs of quite an extraordinary length, being more than 3 times as long as the body, and of narrow cylindrical form.

Colour of the living animal not yet ascertained.

Length of adult female 2.30 mm.

*Remarks.*—My identification of the above-described form with Norman's *Enterocola eruca* is only based on its occurrence in the same host. For the remarks given by Norman are much too scanty for allowing any more exact comparison. It is undoubtedly congeneric with Canu's species, but differs conspicuously in the structure of the anterior lip, and more particularly in the enormous development of the ovisacs.

*Occurrence.*—Two female specimens, the one ovigerous, of this form were taken, many years ago, from as many specimens of *Styela intestinalis* collected in the upper part of the Christiania Fjord. Norman also obtained his specimen from the same Ascidian.

*Distribution.*—Shetland Isles (Norman).

Gen. 16. *Enterocola*, v. Benden 1860.

*Generic Characters.*—Body (of female) more or less slender, with the anterior division well marked off from the posterior and divided by slight constrictions into the normal number of segments. Tail more perfectly segmented than in *Cryptopodus*. Anterior antennæ very small. Posterior antennæ much larger, with the terminal joint lamellar and fringed at the end with spines or setæ. Anterior lip rounded. Maxillæ and maxillipeds rather

coarsely built, the former terminating in a stout conical process turned obliquely inwards, and having outside a scale-like palp edged with coarse spines; the latter imperfectly prehensile, with the distal joint produced at the end into 2 coarse spines. The 4 anterior pairs of legs more perfectly developed than in *Cryptopodus*, the basal part being well defined and biarticulate; rami comparatively small, uniarticulate, the outer one simple mucroniform, the inner lamelliform and provided at the end with 2 setæ; between each pair of these legs a thin connecting plate present, of different form in the different species. Last pair of legs transformed to 2 rather large curved lamellæ projecting on each side from the hind end of the trunk, and separated dorsally by a narrow cleft. Ovisacs less produced than in the preceding genus.

*Remarks.*—This genus was established as early as the year 1860 by v. Beneden, and ought of course to be considered as the type of the present family. It differs conspicuously from the preceding genus, especially as regards the structure of the posterior antennæ and the oral parts. Moreover the legs are built on a somewhat different type, and the transformed last pair bear an evident resemblance to those in some of the *Botryllophilidæ* (*Pteropygus*, *Schizoproctus*). A quite peculiar character of this genus is also found in the presence of a well-marked connecting plate between each pair of the 4 anterior pairs of legs. Two species of the present genus have been formerly recorded, viz., *E. fulgens* v. Beneden and *E. Betencourti* Canu. The Norwegian form described below cannot be referred to any of these 2 species.

27. *Enterocola bilamellata*, G. O. Sars, n. sp.

(Pl. XXXVI, 1)

*Specific Characters.*—*Female.* Body comparatively slender, with the anterior division almost perfectly cylindrical in shape, being scarcely at all narrowed in front. Cephalic segment nearly as large as the succeeding segment, and terminating in a blunt rostral prominence. Tail nearly attaining in length  $\frac{1}{3}$  of the anterior division and rather swollen at the base, being composed of 4 well defined segments gradually narrowed behind. Caudal rami about the length of the last 2 segments combined and rather narrow, without any armature whatever. Anterior antennæ comparatively small, conical in form, and apparently composed of 4 joints, the 1st much the largest, the last very small, tuberculiform, without any bristles. Posterior antennæ with the distal joint remarkably large, forming a recurved oblong or linguiform plate divided at the end into 7 thin setiform appendages of unequal length. Maxilles with a



small bispinose lappet inside turning towards the mouth, terminal prominence very coarse, resembling somewhat in shape the molar process of the mandibles in higher Crustacea; palpe sub-spatulate in form, and armed on the broadly rounded terminal edge with 5 coarse spines of equal size. Maxillipeds short and stout, with a small conical process inside the large proximal joint; distal joint strongly chitinated, incurved, and projecting at the end into 2 coarse and somewhat unequal spiniform processes. The 4 anterior pairs of legs of essentially same structure, 2nd basal joint well defined from the 1st and projecting outside in a small, knob-like prominence; inner ramus oval in form, with the 2 apical setæ rather slender and considerably exceeding the ramus in length; connecting plate between these legs divided by a deep incisure into 2 rather prominent linguiform lamellæ. Last pair of legs obliquely oval in form and slightly upturned, advancing on each side somewhat over the base of the tail, each having on the posterior edge 2 small bristles. Ovisacs not present in the specimen examined.

Colour of the living animal not yet ascertained.

Length of the body 2.60 mm.

*Male* unknown.

*Remarks.*—The above-described form is unquestionably referable to the genus *Enterocola* of v. Beneden, but differs from the 2 other known species by the comparatively narrow cylindrical form of the anterior division of the body, as also in the structure of the posterior antennæ and oral parts. Another character by which this form is easily recognised is the peculiar bilamellar shape of the connecting plates between the 4 anterior pairs of legs. The specific name here proposed alludes to this character.

*Occurrence.*—A solitary specimen only of this form, an apparently fully grown female, but without ovisacs, has as yet come under my notice. It was found in a bottom-sample taken at Farsund, south coast of Norway, from a depth of about 40 fathoms, and had undoubtedly by some accident been thrown out from its abode within some compound Ascidian.

## Gen. 17. *Mycophilus*, Hesse, 1865.

*Generic Characters.*—Body of female soft, vermiform, and more or less strongly curved dorsally, with no sharp demarcation between the anterior and posterior divisions. Trunkal segments indicated by slight constrictions of the body. Tail however not at all segmented, sac-like, with 2 very small lamellæ (the caudal rami) on the blunted extremity. Anal orifice not, as usual,



occurring at the end of the tail between these lamellæ, but transferred far in front on the dorsal face of the body, on which account the posterior part of the intestinal canal forms a peculiar coil within the caudal part. Antennæ and oral parts very imperfectly developed and densely crowded. Only 4 pairs of rudimentary legs present, the 5th pair being wholly absent. Ovisacs not yet observed.

*Remarks.*—This is one of the many genera established by Hesse for the peculiar parasites obtained by him from compound Ascidians. Indeed some of the characters distinguishing the present genus are so strange, that it could seem somewhat questionable if it might be included in the same family with the 2 preceding genera. Yet, some points of agreement are found to exist with the genus *Enteropsis* of Aurivillius, which is regarded as a true Enterocolid. The genus as yet only comprises a single species, to be described below.

## 28. *Mychophilus roseus*, Hesse.

(Pl. XXXVI, 2)

*Mychophilus roseus*, Hesse, Recherches sur les Crustacés rares ou nouveaux des côtes de France. Ann. d. sci. nat. Zoologie, Ser. 5, Vol. IV.

Syn: *Enteropsis wararensis*, Scott.

*Specific Characters.*—*Female.* Body slender, cylindrical in form, though having its posterior part always strongly curved dorsally. Cephalic segment comparatively small and somewhat contracted in front, terminating in a very minute knob-like rostral prominence. Trunkal segments only faintly marked, the last one confluent with the tail. Caudal part of body nearly occupying half the entire length, and scarcely at all narrower than the anterior division, its extremity bluntly rounded and carrying 2 very small blade-like caudal rami. Anal orifice occurring nearly in the middle of the dorsal face of the body, and defined by 2 distinctly projecting lips. Posterior part of the intestine rather narrow and forming a more or less deep coil within the tail, ascending along its dorsal face to the anal orifice. Anterior antennæ very small, and apparently only composed of 2 joints. Posterior antennæ with the distal joint abruptly recurved and terminating in an acute point. Maxillæ of a somewhat similar shape, but provided with a small lateral appendage (palp). Maxillipeds poorly developed, imperfectly articulate, and terminating in a very small hook-like point. Legs of uniform appearance, forming simple conical prominences extending laterally and each terminating in 2 very minute chitinous pieces (rudiments of rami). Ovisacs not yet observed.

Colour of the living animal pale rosy.

Length of adult female 1.50 mm.

*Male* unknown.

*Remarks.*—The figure given by Hesse does not leave any doubt on the identity of the above-described form with that observed by him, and it is likewise quite certain that the form recorded by Scott under the name of *Enteropsis wararensis* is the same species. Its very peculiar outward appearance renders it indeed easily recognisable from any other members of the present family.

*Occurrence.*—Some female specimens of this peculiar Copepod were obtained, many years ago, at Espevær, west coast of Norway. They were found in a species of *Botryllus*, taken up from a depth of about 20 fathoms.

*Distribution.*—Coast of France (Hesse), Scottish coast (Scott).

## Supplement.

### Gen. **Buprorus**, Thorell.

(See p. 61)

Of this remarkable genus, hitherto only represented by a solitary species, *B. Lovéni* Thorell, I have recently had an opportunity of examining a well defined new species, to be described below.

#### 29. **Buprorus Nordgaardi**, G. O. Sars, n. sp.

(Pl. XXXVII, 1.)

*Specific Characters.*—*Female.* Body exhibiting the short bag-like form characteristic of the genus, though having the cephalic part considerably more exerted, and the posterior part, limiting the incubatory cavity, greatly expanded and broadly rounded off behind. Dorsal face of trunk exhibiting throughout a dense clothing of small scale-like prickles. Anterior antennæ resembling in shape those in *B. Lovéni*, being however divided into 7 well defined joints clothed in front with rather strong and somewhat unequal curved setæ, the 3 outermost joints much smaller than the others. Posterior antenna with the terminal joint nearly as large as the middle one and armed on the transversely truncated extremity with a stout spine followed by 4 somewhat curved setæ.

Mandibles considerably stronger than in the type species, with the palp well defined, conical in form, and provided at the tip with 2 unequal setæ. Maxillæ and posterior maxillipeds nearly as in *B. Lovéni*. Anterior maxillipeds, however, somewhat different, being comparatively more powerfully developed, with only a single bispinose lobe inside, and the terminal part undivided, claw-like, carrying outside, about in the middle, a bundle of 3 curved setæ. Legs on the whole less robust than in the type species, with the rami narrower and the spines on both of them uniseriate and much more slender, nearly setiform, 2 of them attached outside the terminal joint of the outer ramus; 4th pair smaller than the preceding ones, and having the number of spines considerably reduced. Last pair of legs about as in *B. Lovéni*, but with the apical spines more slender.

Colour of the living animal not yet ascertained.

Length of adult female scarcely exceeding 0.70 mm.

*Male* unknown.

*Remarks.*—The above-described form is unquestionably referable to the genus *Buprurus* of Thorell, but differs from the type species decidedly both as regards the general shape of the body and in the structure of some of the appendages, as indicated in the above diagnosis. It is also of much inferior size.

*Occurrence.*—2 female specimens of this form, the one with the incubatory cavity filled with embryos in the last (Nauplian) stage, were found in a small compound Ascidian (*Amoroecium*) taken by Mr. O. Nordgaard in the Trondhjem Fjord and kindly sent to me for examination together with other kinds of Ascidians. The species is named in honour of that distinguished naturalist, who also otherwise has assisted me in my investigation of the Norwegian Copepoda.

## Fam. Anomopsyllidæ.

### Gen. *Anomopsyllus*, G. O. Sars, n.

*Generic Characters.*—Body (of female) divided into 3 sharply defined sections: head, trunk and tail. Head comparatively small, triangular in form. Trunk rather tumid and without any distinct segmentation. Tail comparatively short and much narrower than the trunk, terminating in 2 diverging caudal



rami provided with the usual number of setæ. Antennæ attached close together, the anterior ones slender, multiarticulate, the posterior ones much smaller and not prehensile. Oral parts imperfectly developed, except the posterior maxillipeds, which are of a very peculiar structure and apparently prehensile, terminating in a narrow and very mobile digit minutely clawed at the tip. Only 3 pairs of legs present, all very imperfectly developed, forming small and simple triangular lamellæ without any armature whatever. 2 ovisacs present in female attached to the sides of the genital segment.

*Remarks.*—It is very questionable, if this remarkable genus at all is referable to the *Notodelphyoida*, and it is only provisionally recorded here, as I am at present unable to determine with certainty its true systematic position. In any case it ought to be regarded as the type of a quite distinct family, *Anomopsyllidæ*. The genus is founded on a single species, to be described below.

30. *Anomopsyllus pranizoides*, G. O. Sars, n. sp.

(Pl. XXXVII, 2)

*Specific Characters.*—*Female.* Body moderately slender, exhibiting in its general outline a perplexing similarity to a *Praniza*. Head rather small and produced in front to a beak-like prominence, its lateral edges abruptly curved behind. Trunk oblong oval in form, somewhat narrower in front than behind, posterior extremity very slightly emarginated in the middle, with the lateral corners evenly rounded off. Tail scarcely exceeding in length  $\frac{1}{3}$  of the trunk, and apparently only composed of 3 segments, the 1st, or genital one, being rather tumid at the base; anal segment larger than the middle one and not dilated distally. Caudal rami narrow, sublinear in form, and considerably diverging, being about as long as the anal segment, each carrying at the tip 4 setæ, the 2 middle ones rather slender and abruptly bent outwards, the other 2 very small; seta of outer edge attached about in the middle. Anterior antennæ comparatively slender and attenuated, fully attaining the length of the head, and composed of 7 joints clothed with a few slender setæ. Posterior antennæ scarcely exceeding in length  $\frac{1}{3}$  of the anterior, and composed of 3 nearly equal-sized joints, the last one tipped with a number of somewhat unequal setæ. Oral area exhibiting in the middle a rather wide hollowed space limited in front by a slightly curved projecting border, probably answering the anterior lip, and behind by a narrow oblong triangular plate (metastome). Mandibles and maxillæ undistinguishable, being replaced by an irregularly twisted chitinous frame limiting the above-mentioned hollowed space on each



side and sending off inwards 2 short prominences. Anterior maxillipeds very little prominent, and of a somewhat pyriform shape, converging anteriorly, and each terminating in a knob-like point closely applied to the anterior extremity of the metastomal plate. Posterior maxillipeds freely projecting and rather fully developed, but very unlike in structure those in other Copepoda, being doubly geniculate and composed of 4 joints, the 2nd of which is very large and lamellarly expanded inside; last 2 joints much narrower and forming together a slender very mobile digit, which is allowed to impinge against the inner sharpened edge of the preceding joint; proximal joint of this digit unarmed, distal joint somewhat attenuated and armed at the tip with 2 very small claws and, at some distance from the extremity, with another somewhat stronger claw. Legs with a slight indication to a division in a basal and terminal part, the latter exerted to an obtuse point without any traces of spines or setæ; 1st pair somewhat larger than the other 2, which successively diminish in size. Ovarial tubes in the specimen examined very conspicuous, extending throughout the greater part of the trunk, 2 tubes present on each side connected behind by a narrow commissure. Ovisacs broken off in the specimen examined, though indicated by a trifling piece of their coating still adhering to each side of the genital segment.

Colour of the living animal not yet ascertained.

Length of the specimen examined about 3 mm.

*Male* unknown.

*Remarks.*—The above-described form may be at once recognised from any of the hitherto known Copepoda. Indeed, the curious similarity it exhibits in the general outline of the body with a *Praniza* is very striking, and has given rise to the specific name here proposed. On the parasitic nature of this Copepod, no doubt can arise.

*Occurrence.*—A solitary specimen of this remarkable Copepod was found, detached from its host, in a bottom-sample taken in the upper part of the Christiania Fjord. In the same sample several other invertebrate animals were contained, among them also some Annelids, and it seems to me not improbable, that the present Copepod had originally been attached to one of these Annelids.

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<sup>1)</sup> I have not had an opportunity of consulting these papers.



## SYSTEMATIC LIST

OF THE SPECIES DESCRIBED IN THE PRESENT VOLUME.

### Monstrilloida.

#### Monstrilloida cyclopimorpha.

##### Thaumatopsyllidæ.

*Thaumatopsyllus*, G. O. Sars.

*paradoxus*, G. O. Sars.

#### Monstrilloida genuina.

##### Monstrillidæ.

*Monstrilla*, Dana.

*longicornis*, Thompson.

*longiremis*, Giesbrecht.

*clavata*, G. O. Sars.

*leucopis*, G. O. Sars.

*gracilicauda*, Giesbrecht.

*helgolandica*, Claus.

*serricornis*, G. O. Sars.

*Cymbasoma*, Thompson.

*rigidum*, Thompson.

*Thompsoni*, Giesbrecht.

*longispinosum*, Bourne.

*Monstrillopsis*, G. O. Sars.

*dubia*, Scott.

### Notodelphyoida.

#### Notodelphyidæ.

*Notodelphys*, Allman.

*Allmani*, Thorell.

*rufescens*, Thorell.

*caerulea*, Thorell.

*agilis*, Thorell.

*tenera*, Thorell.

*elegans*, Thorell.

*prasina*, Thorell.

*Agnathaner*, Canu.

*typicus*, Canu.

#### Doropygidæ.

*Doropygus*, Thorell.

*pulex*, Thorell.

*psyllus*, Thorell.

*porcicauda*, Brady.

*Doropygopsis*, G. O. Sars.

*longicauda*, Aurivillius.

*Doropygella*, G. O. Sars.

*Thorelli*, Aurivillius.

**Pachypygus**, G. O. Sars.

*gibber*, Thorell.

**Notopterophorus**, Costa.

*auritus*, Thorell.

*papilio*, Hesse.

*micropterus*, G. O. Sars.

**Gunentophorus**, Costa.

*globularis*, Costa.

**Botachus**, Thorell.

*cylindratus*, Thorell.

### **Buproridæ.**

**Buprorus**, Thorell.

*Lovèni*, Thorell.

*Nordgaardi*, G. O. Sars.

### **Ascidicolidæ.**

**Ascidicola**, Thorell.

*rosea*, Thorell.

### **Botryllophilidæ.**

**Botryllophilus**, Hesse.

*brevipes*, G. O. Sars.

**Pteropygus**, G. O. Sars.

*vestitus*, G. O. Sars.

**Schizoproctus**, Aurivillius.

*inflatus*, Aurivillius.

### **Enterocolidæ.**

**Cryptopodus**, Hesse.

*brevicauda*, Canu.

*eruca*, Norman.

**Enterocola**, v. Beneden.

*bilamellata*, G. O. Sars.

**Mycophilus**, Hesse.

*roseus*, Hesse.

### **Anomopsyllidæ.**

**Anomopsyllus**, G. O. Sars.

*pranizoides*, G. O. Sars.



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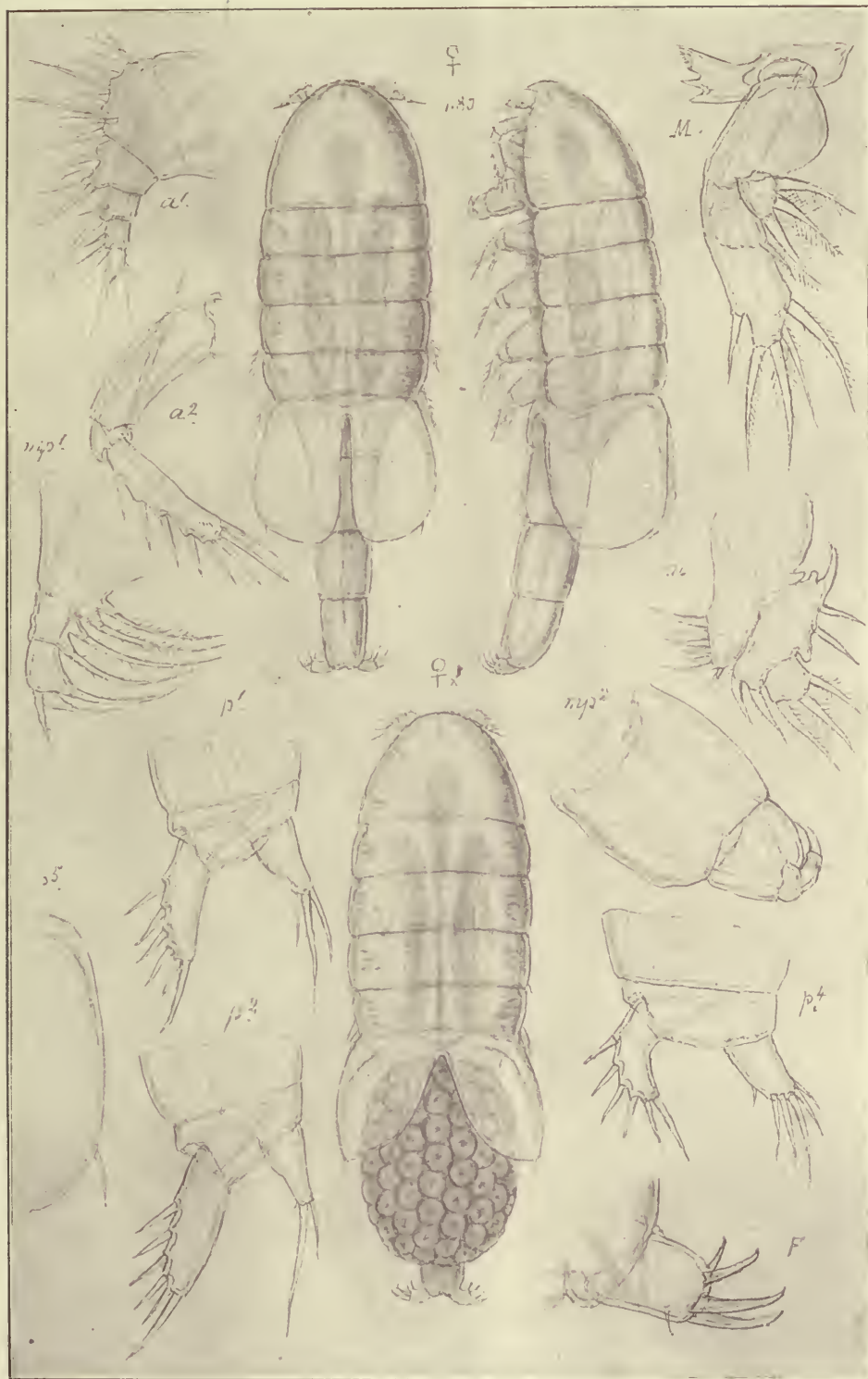


# Copepoda

Botryllophilidæ

Notodelphyoida

Pl. XXXIII



G. O. Sars del.

*Pteropygus vestitus*, G. O. Sars



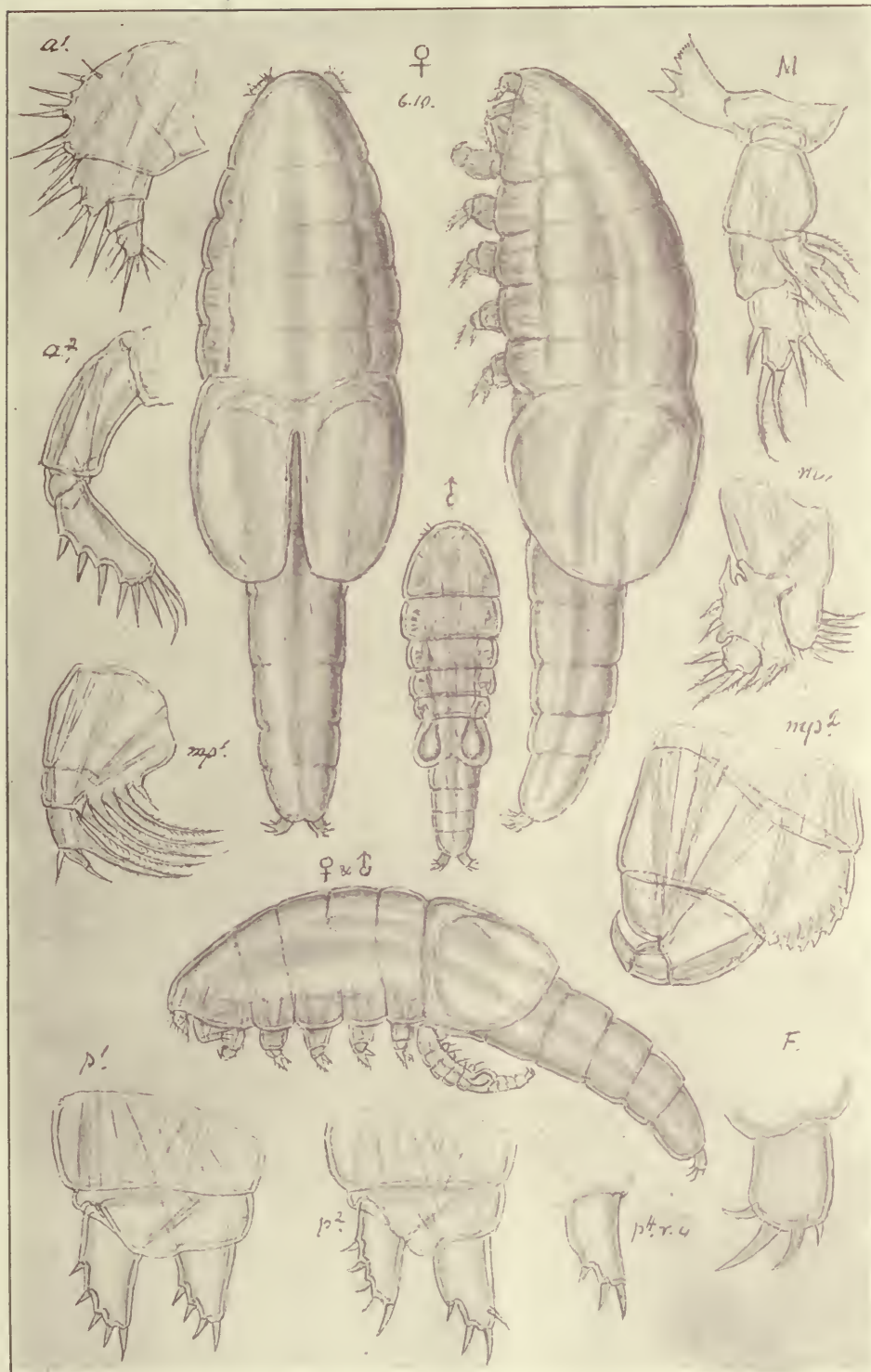


# Copepoda

Botryllophilidæ

## Notodelphyoida

Pl. XXXIV



G. O. Sars del.

Schizoproctus inflatus, Auriv.



# Copepoda

Enterocolidæ

Notodelphyoida

Pl. XXXV



G. O. Sars del.

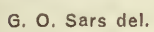
1. *Cryptopodus brevicauda* (Canu)
2. " *eruca* (Norman)





## Notodelphyoida

Pl. XXXVI



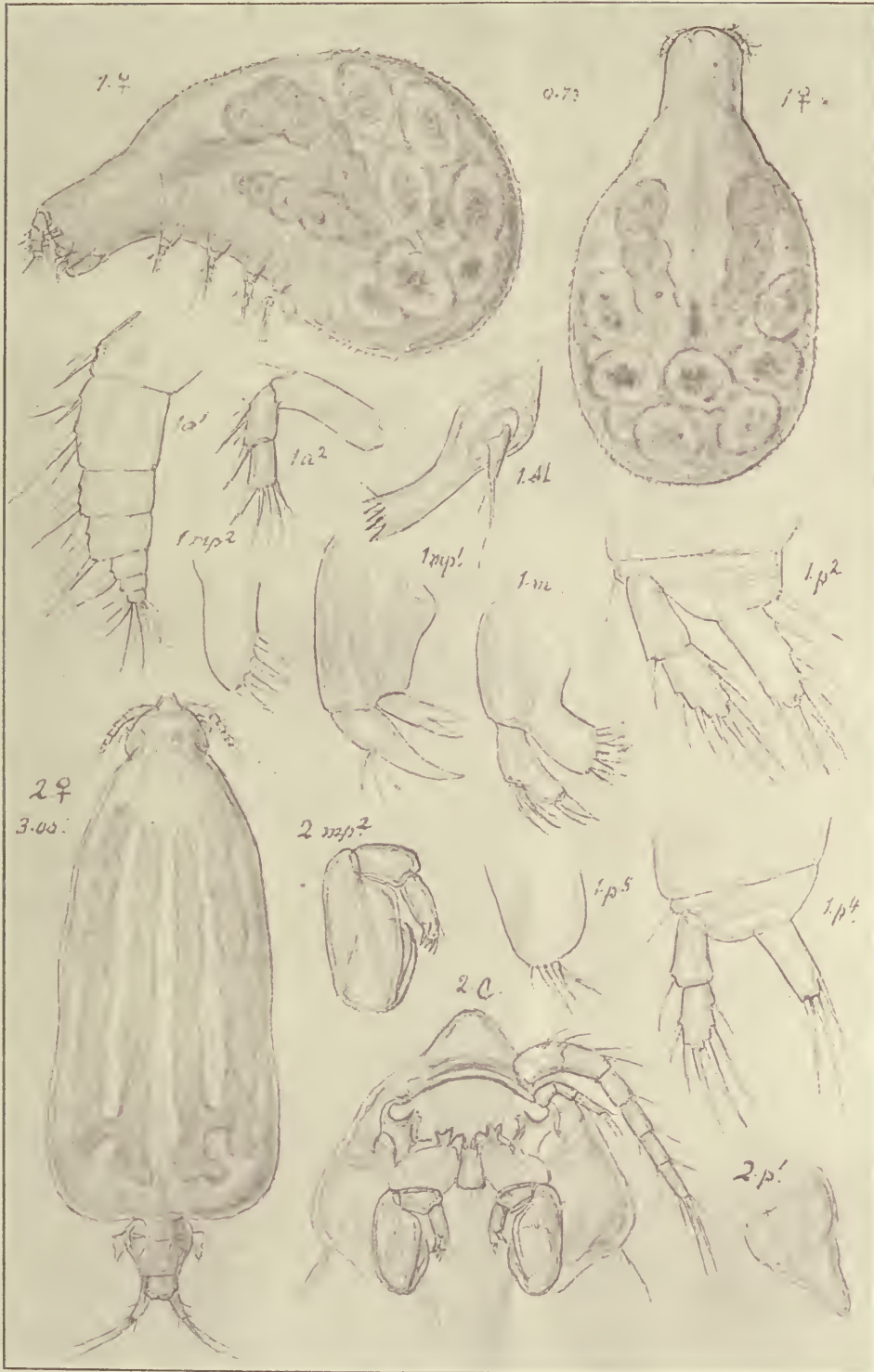
1. *Enterocola bilamellata*, G. O. Sars
2. *Mychophilus roseus*, Hesse



# Copepoda

Buproridæ — Anomopsyllidæ Notodelphyoida

Pl. XXXVII



G. O. Sars del.

1. *Buprorus Nordgaardi*, G. O. Sars
2. *Anomopsyllus pranizoides*, G. O. Sars





AN ACCOUNT  
OF THE  
CRUSTACEA  
OF  
NORWAY

WITH SHORT DESCRIPTIONS AND FIGURES OF ALL THE SPECIES

BY

G. O. SARS

PROFESSOR OF ZOOLOGY AT THE UNIVERSITY OF OSLO

VOL. IX

OSTRACODA

WITH 119 AUTOTYPIC PLATES



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1928

AN ACCOUNT

# CRUSTACEA

NOHMY

THE CRUSTACEA OF THE NORTH PACIFIC OCEAN

BY G. O. SARRIS

U.S. DEPARTMENT OF AGRICULTURE

WASHINGTON

GOVERNMENT PRINTING OFFICE

1912



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## PREFACE.

Professor Georg Ossian Sars died after some weeks of ill-health on April 9, 1927; on the 20th of the same month he would have filled his ninetieth year. Among his papers were found the manuscript and the drawings to Parts XV and XVI, which were intended to form the conclusion of Volume IX, Ostracoda. Professor Sars had also written the 'Systematic List' and the 'List of Plates' of this volume.

The proofs of Parts XV & XVI have been read by Mr. Sigurd Johnsen (Zool. Dept., Bergen Museum), who has also prepared the Alphabetical Index to Vol. IX. Mr. Johnsen wants to remark that in a few cases the names as written in the manuscript of Syst. List differ from those used previously in the text; in 'List of Corrections' these cases are noted together with some misprints which were observed when preparing the index.

During his long and industrious life Professor Sars worked in many branches of marine zoology (Whales, Fishes, Mollusks etc.) and everywhere with singular success; in later years his special studies centred in the vast field of the Crustacea. The first parts of "An Account of the Crustacea of Norway" were published in 1890. Though Sars did not reach to complete this work, the nine volumes published, comprising abt. 2400 pages of text and more than 1100 plates, will always remain a standard source of knowledge to all students of this group and a monument to the genius of G. O. Sars. The Board of Directors of the Bergen Museum is proud of having been the medium of presenting this work to the scientific world.

Bergen, January, 1928.

## CORRECTIONS.

- Page 97. *Cypria ophthalmica*, read *ophthalmica*.  
,, 109. *Iliocyprella* is in Manuscript Syst. List written *Ilyocyprella*.  
,, 148. *Limnocythere* (*Limnocytherinæ*) is in Man. Syst. List. written *Limnocythere* (-inæ).  
,, 171. *Leptocythera* n. g., read *Leptocythere* n. g.  
,, 194. *Cythereis echinata*, Pl. LXXXIX, read Pl. XC.  
,, 195. *Cythereis dunelmensis*, Pl. XC, read Pl. LXXXIX.

(From comparison of the plates with the descriptions of these two species, and also with Norman's figure of *C. dunelmensis* in Nat. Hist. Trans. Northumb. & Durham, Vol. I, Pl. VII, Figs. 1—4, it is evident that the text on the plates are correct, the reference number wrong; corrected by me in List of Plates).

- Pl. XLVI. Jurine, read (O. F. Müller).  
,, C. *Cytheruræ dathrata*, read *Cytherura clathrata*.

S. J.



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## SYSTEMATIC LIST

OF THE SPECIES DESCRIBED IN THE PRESENT VOLUME.

### Myodocopa.

#### Cypridinidæ.

Cypridina, M-Edw.

norvegica, Baird.

megalops, G. O. Sars.

Philomedes, Lilljeborg.

globosus, Lilljeborg.

Lilljeborgi, G. O. Sars.

Asterope, Philippi.

mariaë, Baird.

abyssicola, G. O. Sars.

#### Conchoeciidæ.

Conchoecia, Dana.

elegans, G. O. Sars.

borealis, G. O. Sars.

obtusata, G. O. Sars.

### Cladocopa.

#### Polycopidæ.

Polycope, G. O. Sars.

orbicularis, G. O. Sars.

punctata, G. O. Sars.

areolata, G. O. Sars.

clathrata, G. O. Sars.

pustulata, G. O. Sars.

sublævis, G. O. Sars.

Polycopsis, G. W. Müller.

compressa, Brady & Robertson.

### Platycopa.

#### Cytherellidæ.

Cytherella, Bosquet.

abyssorum, G. O. Sars.

### Podocopa.

#### Cypridæ.

##### *Pontocyprinæ.*

Pontocypris, G. O. Sars.

trigonella, G. O. Sars.

Erythrocypris, G. W. Müller.

mytiloides, Norman.

hispida, G. O. Sars.

pallida, G. O. Sars.

Argilloecia, G. O. Sars.

cylindrica, G. O. Sars.

conoidea, G. O. Sars.

##### *Macrocyprinæ.*

Macrocypris, Brady.

minna, Baird.

Macrocypris, G. O. Sars.

angusta, G. O. Sars.

##### *Bairdiinæ.*

Bythocypris, Brady.

bosquetiana, Brady.

obtusata, G. O. Sars.



**Bairdia**, M'Coy.

inflata, Norman.

*Cyprinæ.**Paracyprides.***Paracypris**, G. O. Sars.

polita, G. O. Sars.

*Candonides.***Candona**, Baird.

candida, O. Fr. Müller.

neglecta, G. O. Sars.

lapponica, Ekman.

caudata, Kaufmann.

Sarsi, Hartwig.

rostrata, Brady &amp; Norman.

marchica, Hartwig.

stagnalis, G. O. Sars.

albicans, Brady.

compressa, Koch.

**Cryptocandona**, Kaufmann.

Våvrai, Kaufmann.

reducta, Alm.

**Candonopsis**, Våvra.

Kingsleyi, Brady &amp; Robertson.

*Cyclocyprides.***Cyclocypris**, Brady & Norman.

globosa, G. O. Sars.

ovum, Jurine.

lævis, O. Fr. Müller.

serena, Koch.

**Cypria**, Zencker.

exsculpta, Fischer.

ophthalmica, Jurine.

lacustris, G. O. Sars.

*Notodromides.***Notodromas**, Lilljeborg.

monachus, O. Fr. Müller.

**Cyprois**, Zencker.

marginata, Strauss.

*Ilyocyprides.***Ilyocypris**, Brady & Norman.

biplicata, Koch.

gibba, Ramdohr.

**Ilyocyprella**, Daday.

Bradyi, G. O. Sars.

*Eucyprides.***Cypris**, O. Fr. Müller.

pubera, O. Fr. Müller.

**Eucypris**, Våvra.

virens, Jurine.

crassa, O. Fr. Müller.

elliptica, Baird.

**Cypricercus**, G. O. Sars.

fuscatus, Jurine.

affinis, Fischer.

hirsutus, Fischer.

obliquus, Brady.

**Cyprinotus**, Brady.

salinus, Brady.

fretensis, Brady.

**Heterocypris**, Claus.

incongruens, Ramdohr.

**Dolerocypris**, Kaufmann.

fasciata, O. Fr. Müller.

**Herpetocypris**, Brady & Norman.

reptans, Baird.

**Prionocypris**, Brady & Norman.

lutaria, Koch.

glacialis, G. O. Sars.

pigra, Fischer.

olivacea, Brady &amp; Norman.



*Cypridopsides.*

**Pionocypris**, Brady & Norman.

vidua, O. Fr. Müller.

helvetica, Kaufmann.

obesa, Brady & Norman.

elongata, Kaufmann.

Almi, G. O. Sars.

picta, Strauss.

**Cypridopsis**, Brady.

aculeata, Costa.

**Cypridopsella**, Kaufmann.

villosa, Jurine.

*Darwinulinæ.*

**Darwinula**, Brady & Norman.

Stevensoni, Brady & Robertson.

**Cytheridæ.**

*Limnocytherinæ.*

**Limnocythere**, Brady,

sancti-patricii, Brady & Robertson.

inopinata, Baird.

*Cytherideinæ.*

**Cytherissa**, G. O. Sars.

lacustris, G. O. Sars.

**Cyprideis**, Jones.

littoralis, Brady.

sorbyana, Jones.

**Cytheridea**, Bosquet.

papillosa, Bosquet.

punctillata, Brady.

**Eucythere**, Brady.

argus, G. O. Sars.

declivis, Norman.

**Krithe**, Brady & Robertson.

bartonensis, Jones.

*Cytherinæ.*

**Cythere**, O. Fr. Müller.

lutea, O. Fr. Müller.

albomaculata, Baird.

viridis, O. Fr. Müller.

**Leptocythere**, G. O. Sars.

pellucida, Baird.

macallana, Brady.

castanea, G. O. Sars,

tenera, Brady.

crispata, Brady.

**Cytheromorpha**, Hirschman,

fuscata, Brady.

**Xenocythere**, G. O. Sars.

cuneiformis, Brady.

**Kyphocythere**, G. O. Sars.

limicola, Norman

**Hemicythere**, G. O. Sars.

villosa, G. O. Sars.

emarginata, G. O. Sars.

crenulata, G. O. Sars.

finmarchica, G. O. Sars.

qvadridentata, Baird.

angulata, G. O. Sars.

latimarginata, Speyer.

concinna, Jones.

oblonga, Brady.

**Cythereis**, Jones.

tuberculata, G. O. Sars.

echinata, G. O. Sars.

dunelmensis, Norman.

Jonesi, Baird.

mucronata, G. O. Sars.

*Cytherurinæ.*

**Cytherura**, G. O. Sars.

gibba, O. Fr. Müller.

nigrescens, Baird.

similis, G. O. Sars.

sella, G. O. Sars.

atra, G. O. Sars.

intumescens, G. O. Sars.  
 affinis, G. O. Sars.  
 striata, G. O. Sars.  
 producta, Brady.  
 acuticostata, G. O. Sars.  
 lineata, Brady.  
 undata, G. O. Sars.  
 fulva, Brady & Robertson.  
 clathrata, G. O. Sars.  
 cellulosa, Norman.

*Loxoconchineæ.*

**Loxoconcha**, G. O. Sars.  
 impressa, Baird.  
 granulata, G. O. Sars.  
 tamarindus, Norman.  
 fragilis, G. O. Sars.

**Cytheropteron**, G. O. Sars.  
 latissimum, Norman.  
 alatum, G. O. Sars.  
 hamatum, G. O. Sars.  
 punctatum, Brady.  
 crassipinnatum, Brady & Norman.  
 angulatum, Brady.  
 subcircinatum, G. O. Sars.  
 testudo, G. O. Sars.  
 inflatum, Brady.  
 nodosum, Brady.

*Bythocytherinæ.*

**Bythocythere**, G. O. Sars.  
 turgida, G. O. Sars.  
 constricta, G. O. Sars.  
 Bradyi, G. O. Sars.

dromedaria, G. O. Sars.  
 insignis, G. O. Sars.

**Pseudocythere**, G. O. Sars.  
 caudata, G. O. Sars.

**Macrocythere**, G. O. Sars.  
 simplex, Norman.

*Xestoleberinæ.*

**Xestoleberis**, G. O. Sars.  
 aurantia, Baird.  
 depressa, G. O. Sars.

*Paradoxostominæ.*

**Sclerochilus**, G. O. Sars.  
 contortus, Norman.

**Paracytherois**, G. W. Müller.  
 arcuata, Brady.  
 flexuosa, Brady.  
 producta, Brady & Norman.

**Cytherois**, G. W. Müller.  
 Fischeri, G. O. Sars.  
 vitrea, G. O. Sars.  
 pusilla, G. O. Sars.

**Paradoxostoma**, Fischer.  
 variabile, Baird.  
 ensiforme, Brady.  
 obliquum, G. O. Sars.  
 Bradyi, G. O. Sars.  
 hibernicum, Brady.  
 pulchellum, G. O. Sars.  
 abbreviatum, G. O. Sars.  
 Normani, Brady.  
 rostratum, G. O. Sars.

## INTRODUCTION.

The Ostracoda form a very sharply defined order of Crustacea, the most conspicuous feature of which is the presence of a bivalved shell, into which the body with its several appendages may be wholly withdrawn, the valves admitting of being closed by the aid of an adductor muscle traversing the body and attached to the inside of the valves at about their centres. They thereby at the first sight look rather like small mussels, and their popular name "mussel-shrimps" is indeed derived from that character. The only other Crustacea in which a somewhat similar feature is met with, is a group of the *Phyllopoda* (Conchostraca). The Ostracoda are however very essentially distinguished from these Crustacea by the want of any distinctly defined cephalic part or head, as also by the considerable reduction of the postoral limbs. Whereas in the conchostracous Phyllopoda more than 20 pairs of limbs may be found behind the mouth, the number of these limbs in the Ostracoda never exceeds 4 pairs and may be reduced to 3 (*Cytherella*) and even to only 2 pairs (*Polycope*); nor do these limbs in any case assume the uniform foliaceous appearance characteristic of the Phyllopoda. As to the preceding limbs, the anterior antennæ are far less rudimentary than in the above-named Crustacea, and the mandibles are always provided with distinct, in some cases very powerfully developed palps, whereas such palps are wholly absent in the *Phyllopoda* as also in the nearly allied group *Cladocera*, at least in the adult stage of the animal. The body, as a rule, terminates in 2 juxtaposed procurved rami, in some cases very movable and strongly spinous or claved at the edges, in other cases however much reduced. These rami evidently answer to the so-called "post-abdomen" in the Cladocera and the conchostracous Phyllopoda, but are scarcely at all homologous with the "furca" of the *Copepoda*, though generally so termed by recent authors.



The greater number of the Ostracoda are of rather small size, the average length of the shell only seldom exceeding a pair of millimeters. The largest forms are found among the *Cypridinidæ* (Gigantocypris) and the freshwater Cypridæ (Megalocypris).

Ostracoda are found abundantly both in fresh waters and in the sea. But, whereas the freshwater forms on the whole show a rather uniform appearance, being almost exclusively referable to a single family (the Cypridæ), the marine Ostracoda are much more varied, exhibiting several very distinct types. As to habits, some of the marine forms (Conchoeciidæ) lead apparently a true pelagic existence; but the great majority of Ostracoda are to be regarded as bottom-animals, many of them (Cytheridæ) being even quite devoid of swimming faculty. We have not full evidence of the existence of true parasitism within the present order.

As the shell of most Ostracoda is of a rather firm consistency and in many cases is even strongly calcareous, this part of the animal admits of being rather well preserved also in the fossil state. Indeed, numerous species of Ostracoda have been recorded from almost all fossiliferous formations even up to the Cambrian period, though the true systematic relationship of the oldest genera (Primitia, Leperditia, Beyrichia), by our want of knowledge to the anatomical details, may be regarded as somewhat doubtful.

As to the systematic arrangement of the Ostracoda, at first only a restricted number of families were established, to comprise the known genera, 3 such families being proposed in 1850 by Baird in his well-known work, viz., *Cypridinidæ*, *Cypridæ* and *Cytheridæ*. The first attempt to a more exact systematic grouping of the Ostracoda was made in the year 1865 by the present author<sup>1)</sup>, who proposed to divide the order into 4 principal groups or suborders, each comprising one or more families. The arrangement proposed was as follows: 1. **Myodocopa** with the 2 families *Cypridinidæ* and *Conchoeciidæ*, 2. **Cladocopa** with the family *Polycopidæ*, 3. **Platycopa** with the family *Cytherellidæ*, and 4. **Podocopa** with the 2 families *Cypridæ* and *Cytheridæ*. This classification has been sanctioned by most subsequent authors. G. W. Müller has however in his work on the Ostracoda of the gulf of Naples suggested that the 2 suborders *Cladocopa* and *Platycopa* should more properly be wholly rejected, the family *Polycopidæ* being referred by him to the *Myodocopa* and the family *Cytherellidæ* to the *Podocopa*. I think however that the argumentation given at some length by the said author in support to this view may

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<sup>1)</sup> Oversigt af Norges marine Ostracoder.



be found to be very little convictive, and indeed in the most recent system presented by Dr. Skogsberg in his great work on the marine Ostracoda, the 2 said suborders have been fully admitted as such, though designed with other names, the only difference in his system from that proposed by me being that the family Conchoeciidæ (Halocypridæ) has been wholly separated from the Myodocopa and raised to the rank of a 5th suborder: *Halicypriformes*. As I am not prepared to consent with Dr. Skogsberg in this latter respect, nor find any reasonable raison for changing the names at first given to the suborders, I have felt justified to retain in the present Account my original classification quite unaltered.

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## Suborder 1.

### Myodocopa.

*General Characters.*—Shell exhibiting in front a persistent aperture, as a rule widened by a more or less deep insicure of each valve in this place, and allowing the antennæ to be extruded and freely moved. A frontal tentacle always present. Anterior antennæ never natatory, and more or less dissimilar in the two sexes. Posterior antennæ constituting the sole locomotory organs of the animal, their basal part being remarkably large and muscular, outer ramus very movable, multiarticulate, and provided with strong natatory setæ; inner ramus never natatory, being more or less rudimentary, and in male generally transformed to a grasping organ. Mandibular palps strongly developed, sub-pediform, geniculate on the middle, and clawed at the tip. 4 pairs of postoral limbs present, exhibiting a very varying structure. Caudal rami lamelliform, edged behind with strong claws. A well developed heart present in the middle of the dorsal face. Intestine simple without any coecal appendages. Testicles likewise of a very simple structure.

*Remarks.*—The most prominent feature distinguishing this suborder is unquestionably the restriction of the locomotory faculty to the posterior antennæ, the outer rami of which are in reality the only parts by which the body is propelled. For this purpose of course a very powerful muscular apparatus is needed, and these muscles are found lodged within the basal part of the antennæ, the remarkable size and massive shape of this part being thereby easily explained. During motion the said rami are extended from the frontal opening of the shell and inserted at the base within the incisures of the valves, working like a pair of oars by powerful strokes outwards and behind, thus propelling the animal.

The Myodocopa comprise 2 very sharply defined families, the *Cypridinidae* and the *Conchoeciidae*, which by some authors have been regarded even as groups of a higher systematic rank (see above). Both these families are well represented in the Fauna of Norway. All the known forms are exclusively marine.

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## Fam. I. Cypridinidæ.

*Characters of the family.* Valves of rather firm consistency, in some cases roughly sculptured and highly calcareous, frontal incisure as a rule rather deep and defined above by a more or less projecting rostral prominence. Two compound stalked eyes generally present, and moreover an unpaired central ocellus, from the lower face of which the frontal tentacle issues. Anterior antennæ in both sexes well developed, distinctly geniculate at the base, and carrying at the end strong annulated setæ, one of which, attached posteriorly at some distance from the tip, is generally pronouncedly sensory. Posterior antennæ with the basal part trigonal or cordiform in shape, inner ramus bi- or triarticulate, very small in female, and having none of the joints conspicuously expanded, in male generally larger and prehensile. Mandibles with the masticatory part imperfectly developed, palp strong, with a small exopodal appendage at the end of the 1st joint anteriorly. None of the postoral limbs pediform, the 2nd pair being always provided at the base with a broad semilunar vibratory plate; penultimate pair closely juxtaposed, each terminating in a vertical, broadly triangular lamella; last pair very peculiar, slender vermiform in shape and highly flexible, curving upwards and backwards within the shell, and armed in their outer part with a number of peculiarly modified spines. Caudal lamellæ without any spine in front of the marginal claws. Copulatory appendages in male symmetrical, more or less coalesced at the base. Ripe ova received within the cavity of the shell for accomplishing their first (larval) development.

*Remarks.* The type of this family is the genus *Cypridina* of M. Edwards; to which in recent time several other genera have been added, more or less differing from the type, though retaining most of the characteristic features of that genus. Of these features may be named the presence of compound stalked eyes and a well defined central ocellus, the comparatively full development of the anterior antennæ, the peculiar reduction of the masticatory part of the mandibles, and finally the anomalous structure of the 3 posterior pairs of limbs. Especially is the appearance of the last pair of limbs highly remarkable and unlike that found in any other Ostracods.

3 well defined genera referable to this family are represented in the Fauna of Norway.



## Gen. 1. *Cypridina*, M. Edwards, 1840.

*Generic Characters*.—Sexual dimorphism rather slight. Shell moderately tumid and of a more or less oval shape, with the surface smooth and almost quite devoid of hairs; frontal incisure of valves rather deep and occurring nearly in the middle of the anterior extremity; rostral part, as a rule, not much prominent and curved downwards. Eyes well developed in both sexes, but larger in male than in female. Frontal tentacle short, clavate. Anterior antennæ 7-articulate, and of nearly same structure in the two sexes. Posterior antennæ with the inner ramus in most cases not transformed in male. Mandibles with the masticatory process small, conical in shape, and densely hairy. Palp with the penultimate joint long and narrow, being densely clothed in front with coarse setæ, apical claws very short. Anterior lip forming in front a compressed somewhat securiform expansion finely crenulated at the edge, and having moreover 2 more or less distinctly defined lateral lappets. Maxillæ with 3 well defined masticatory lobes inside the thickish basal part, palp rather strong biarticulate, and provided outside with a thin deflexed lamella terminating in 3 finely ciliated setæ, and apparently constituting the exopodite, distal joint of the palp small, but armed with several strong diverging spines. Anterior maxillipeds of a very compact and complicated structure, with the basal part broad and flattened carrying on the one side the large vibratory plate, on the opposite (inner) side 3 comparatively small subequal masticatory lobes, these lobes being followed by 2 somewhat similar, but much stronger incurved lobes, which together with the adjoining part of the limb may more properly represent the endopodite, the distal lobe being clothed with numerous strong partly pectinate setæ, the proximal one with a row of short stout claws denticulated along the one edge, — the remaining part of the limb apparently represents the exopodite and is of a much more delicate structure, exhibiting a short proximal joint which is produced on each side to a setiferous lappet, the 2 lappets embracing as it were, the base of the succeeding quadrangular joint, to the outer corner of which in some cases a very small apical joint is added<sup>1</sup>). Posterior maxillipeds with 3 or 4 masticatory lobes, the outermost of which, together with the adjoining part, may perhaps represent the endopodite, terminal lamella (exopodite) richly fringed with ciliated setæ, those issuing from the posterior corner being the largest. Last pair of limbs exhibiting the characteristic structure

<sup>1</sup>) The interpretation here given somewhat differs from that set forth by Dr. Skogsberg who described the whole outer part of the limb as the exopodite.



common to all the members of the family *Cypridinidæ*. Caudal lamellæ comparatively large, subtriangular in form, and armed with very strong claws gradually increasing in size distally.

*Remarks.*—This genus was established as early as the year 1840 by M. Edwards, to include a form (*C. Reynaudi*) captured in the Indian Ocean, and conspicuously differing from any other Ostracods at that time known. Subsequently many other species more or less closely agreeing with the form recorded by M. Edwards have been detected, and though some of these have been placed within separate nearly-allied genera, a good deal remain as true members of the old genus *Cypridina*. A grouping of the latter species has recently been attempted by Dr. Skogsberg, who propose to divide the genus into 5 subgenera, viz., *Doloria*, *Vargula*, *Macrocypridina*, *Cypridina* (proper), and *Siphonostraca*. The distinction of these subgenera seems however to me to be in most cases based upon very slight and minutious differences. The 2 Norwegian species described below are both referable to the subgenus *Vargula* of Skogsberg.

### 1. *Cypridina norvegica*, Baird.

(Pl. I—III).

*Cypridina norvegica*, Baird, Notes on the genus *Cypridina*, with description of some new species, Proc. Zool. Soc. London 1860, pag. 200, Pl. LXXI, figs. 4, 4 a—d.

*Specific Characters.*—*Female*. Shell, seen laterally, of a rather regular broadly oval shape, greatest height in the middle and somewhat exceeding  $\frac{2}{3}$  of the length, dorsal margin quite evenly arched and joining the anterior and posterior edges without any trace of an intervening angle, ventral margin likewise uniformly curved, though somewhat less so than the dorsal one, posterior extremity only slightly wider than the anterior and somewhat obliquely blunted, with an indication to a rounded corner below; — seen dorsally or ventrally, oblong oval in shape, with the greatest width in the middle and about equalling half the length, both extremities obtusely pointed. Frontal incisure of the valves rather deep and narrow, obliquely ascending, being defined below by a rather projecting part of the valve bordered above by a thin transversely striated lamella; rostral prominence narrow acuminate, curved downwards, and having the upper edge quite continuous with the dorsal margin of the shell. Valves semipellucid, with the surface smooth and polished, not exhibiting any obvious sculpture. Eyes comparatively small, each with about 8 lenticular bodies embedded in a dark pigment. Ocellus well developed, with the fronal tentacle

very short. Anterior lip with the lateral lappets conically produced. Inner ramus of posterior antennæ slender and attenuated, composed of 3 well defined joints, the last very small and tipped with a long seta. Terminal plate of posterior maxillipeds provided at the posterior corner with 3 (more rarely 4) densely hairy setæ separated from the other marginal setæ by a rather wide interspace. Caudal lamellæ each with 9 claws more or less distinctly denticulated behind.

*Male* somewhat smaller than female and slightly differing in the shape of the shell, the posterior part of which is comparatively lower and more exerted below. Dorsal face of the enclosed body exhibiting behind a number of somewhat irregular conical projections not observed in female. Eyes much larger than in female, each with up to 16 ommatidia. Structure of the several limbs very little differing from that in female. Copulative appendages well developed and confluent for about half their length, the outer part of each appendage terminating inside in a linguiform lobe, outside in a peculiar incurved hami-form process. Spermatozoa very small in the form of clear nucleated cells produced at one end in a hair-like appendage (see Pl. III).

Colour whitish gray, some parts of the body shining through the shell with a darker hue; ova in the incubatory cavity of the shell pale yellowish.

Length of adult female amounting to 3.60 mm., of male to 3.40 mm.

*Remarks.*—The present Ostracod was first described, though very imperfectly by Baird in the year 1860. As the specimen examined by him was taken off the Norwegian coast, I think that the identity of the above-described form with Baird's species cannot properly be questioned. It is the type of the subgenus *Vargula* proposed by Dr. Skogsberg.

*Occurrence.*—I have met with this Ostracod not rarely in several places on the western coast of Norway in greater depths. Especially I found it very abundant off the Lofoten islands, where it occurred on a soft muddy bottom at depths ranging from 80 to 300 fathoms. Some specimens were also taken during the Norwegian North Atlantic Expedition at Stat. 195 north of the Finmark coast.

It is a very active little creature, swimming about rather speedily in a somewhat rolling manner. When disturbed, the animal emits a rather intense phosphorescent light chiefly, it would seem, derived from a yellow fluid secreted from the anterior lip. In habits it is pronouncedly rapacious, feeding eagerly upon any carcass found in its way, and in some instances even attacking living animals. Dr. Østergreen found at one occasion several still living specimens of this Ostracod within the cloaca and the uterine cavity of a *Spinax niger* caught in the Trondhjem Fjord, and was thereby led to the



supposition, that this form lead a parasitic life in the said fish. This is however by no means the case. The Ostracods had simply attacked the Spinax when hanging on the fishing line in a dead or feeble condition, and had entered the most accessible openings of the fish in order to feed upon its soft parts. The finding of allied Ostracods on the gills or other places on recently captured fishes, as mentioned by some other authors, may be explained in a similar manner. On the other hand, the present Ostracod itself is not seldom found to be infested with a peculiar parasit, *Cyproniscus cypridinæ*, described in the 2nd Volume of the present work. The parasit is generally only found on female specimens and occupies the place where otherwise the ova and embryos of the Cypridina are carried during their developement.

*Distribution*.—West coast of Sweden (Skogsberg), Shetland Isles (Norman).

## 2. *Cypridina megalops*, G. O. Sars.

(Pl. IV).

*Cypridina megalops*, G. O. Sars, Undersøgelser over Hardangerfjordens Fauna. Chr. Vid. Selsk. Forh. 1871, pag. 278.

*Specific Characters*.—*Female*. Shell comparatively shorter and stouter than in the preceding species, seen laterally, of a less regularly oval shape, being considerably higher behind than in front, dorsal margin strongly arched in its posterior part, but more slowly declining in front, ventral margin evenly curved, posterior extremity bluntly rounded, with the lower corner but very slightly exerted;—seen dorsally or ventrally, ovale in shape, with the greatest width somewath behind the middle. Frontal incisure of the valves of a similar shape to that in *C. norvegica*; defining angle below however less prominent, and the rostral projection comparatively broader. Surface of shell smooth and polished. Eyes of considerably larger size than in the female of *C. norvegica* and very conspicuous in the living animal. Anterior lip with only slight traces of lateral lappets. Inner ramus of posterior antennæ very small and only composed of 2 joints, distal joint knob-like and terminating in a very long and slender seta. Terminal plate of posterior maxillipeds fringed with an uninterrupted row of about 18 plumose setæ. Caudal lamellæ each armed with 11 claws. Structural details otherwise very little different from those in *C. norvegica*.

*Male* rather like the female in its outward appearance, but slightly larger, and having the posterior part of the shell less broad and somewhat more ex-

erted at the lower corner. Copulative appendages with the 2 terminal lappets of a somewhat different shape from those in the male of *C. norvegica*, the outer lappet being scarcely hamiform.

Body semipellucid, of a similar whitish grey colour to that in the preceding species; ova in the incubatory cavity of a pale orange hue.

Length of adult female amounting to 3.29 mm., of male to 3.35 mm.

*Remarks.*—The above-described form is nearly allied to *C. norvegica*, but may be easily distinguished by the somewhat different shape of the shell, as seen laterally, and more particularly by the large size of the eyes in both sexes, the latter character having given rise to the specific name proposed. Moreover some slight differences may be stated to occur also in the other structural details, as pointed out in the above diagnosis.

*Occurrence.*—Only a limited number of specimens of this form have as yet come under my notice. They were taken in moderate depths, partly in the innermost part of the Hardanger Fjord at Utne, partly off the west coast at Christiansund. Out of Norway this form has not yet been recorded.

## Gen. 2. **Philomedes** Lilljeborg, 1853.

Syn: *Cypridina* Lilljeborg (not M. Edward).  
- *Bradycinetus* G. O. Sars.

*Generic Characters.*—Sexual dimorphism very strongly marked. Shell much more elongate in male than in female, with the frontal sinus of quite a different shape; rostral prominences in female large and procumbent, in male almost horizontally porrected and obtuse at the end. Eyes in female much reduced, in male largely developed. Frontal tentacle in both sexes slender, styliform. Anterior antennæ only composed of 6 joints and rather dissimilar in the 2 sexes, those in male being considerably more elongate and provided at the end of the 4th joint with a strongly developed sensory seta (wanting in female); 2 of the apical setæ moreover enormously prolonged and very mobile, being more generally abruptly reflexed. Posterior antennæ much more powerfully developed in male than in female, with the 3rd joint of the outer ramus remarkably prolonged and the outer joints provided with well developed natatory setæ, whereas these setæ in the adult female are, as a rule, found to be broken off at some distance from the base; inner ramus in female small, biarticulate, in male much larger and distinctly prehensile. An-



terior lip comparatively small, helmet-shaped. Mandibles with the masticatory process cleft at the tip, and obsolete in male. Postoral limbs on the whole built on the same type as in *Cypridina*. Anterior maxillipeds however in female (but not in male) distinguished by the remarkable development of the proximal endopodal lobe, which projects in a large and highly chitinised biangular or securiform piece carrying inside a row of stout claws. Copulative appendages of male comparatively small, lobular at the end.

*Remarks.*—In the year 1853 Prof. Lilljeborg described 2 Cypridinids found by him off the coast of Skåne. The one of them was referred by him to the genus *Cypridina* and named *C. globosa*, the other, of which only a single specimen was found, was regarded as the type of a new genus and recorded under the name *Philomedes longicornis*. The first-named of these 2 forms was subsequently found by the present author rather abundantly on the coast of Norway, and was subjected to a closer anatomical examination, which showed it to be so decidedly different from the species of *Cypridina* that I felt justified to establish for its reception a new genus, which I named *Bradycinetus* in allusion to the slow movements of the animal. I was at that time still of opinion, that the genera *Bradycinetus* and *Philomedes* were very distinct, the one from the other, and it was only several years afterwards that the true relationship between the 2 Cypridinids recorded by Lilljeborg was revealed to me. In the year 1869<sup>1)</sup> I set forth the rather perplexing suggestion that these 2 apparently so widely different forms should more properly be combined into the very same species, *Philomedes longicornis* being nothing else than the adult male of *Cypridina* (*Bradycinetus*) *globosa*. This suggestion has since been fully corroborated both by myself and by other authors, and the remarkable sexual dimorphism in the present genus thereby ratified. Of course the generic name *Bradycinetus* ought to be wholly discarded and replaced by that originally proposed by Lilljeborg for the male sex.

Several of the Cypridinid genera established in recent time approach the present genus rather closely, and have by Dr. Skogsberg been grouped together with it in a subfamily, *Philomedinae*. The genus *Philomedes* proper comprises only a limited number of species, 2 of which belong to the Fauna of Norway.

<sup>1)</sup> Undersøgelser over Christianiafjordens Fauna.

3. *Philomedes globosus* (Lilljeborg).

(Pl. V—VII).

*Cypridina globosa*, Lilljeborg, De Crustaceis ex ordinibus tribus i Skania occurrentibus, p. 171, Pl. XVII, figs. 2—10, Pl. XVIII, figs. 1, 2, 3, 7.

Syn: *Philomedes longicornis* Lilljeborg ♂  
 „ *Asterope grönlandica* Fisher ♀  
 „ *Bradycinetus globosus*, G. O. Sars ♀  
 „ „ *brenda*, Brady ♀  
 „ *Philomedes brenda*, G. O. Sars ♂

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally, of a somewhat irregular rounded oval shape, greatest height in the middle and not fully attaining  $\frac{3}{4}$  of the length, dorsal margin almost straight in the middle, sloping gently in front, more steeply behind, ventral margin evenly curved, posterior extremity broader than the anterior and obliquely blunted, forming below a slightly produced angular corner;—seen dorsally or ventrally, rather regularly ovate, with the greatest width about in the middle and somewhat exceeding half the length. Frontal incisure of valves moderately deep and turned upwards, being overhung by the rather prominent rostral part, which is obliquely truncated at the end, with the upper angle rather slight, the lower produced in a small procurved dentiform point. Valves of rather firm consistency and only slightly transparent, surface evenly vaulted and minutely punctate, being everywhere clothed with short stiff hairs; rostral prominences fringed both in front and below by a hyaline finely ciliated border, selvage below the incisure short and rounded off. Eyes scarcely visible in the living animal, being in most cases quite devoid of pigment. Inner ramus of posterior antennæ very small, with the distal joint somewhat compressed and provided in front with a slender ciliated seta, carrying moreover at the tip a peculiarly tortuous thin bristle abruptly bent at the base; outer ramus very flexible and having almost constantly the outer part of the natatory setæ broken off. Last pair of limbs with a rather great number of cleaning spines, amounting to 28 on each limb. Caudal rami each with 10 marginal claws.

*Male* very unlike the female in its outward appearance, the shell being of a much more elongate, oblong oval shape, with the dorsal and ventral margins only slightly arched. Frontal incisure of valves much wider than in female, almost rectangular, and the rostral prominence far less procumbent, while the tip obtusely blunted and not exhibiting any trace of an angle below. Eyes largely developed and very conspicuous in the living animal. Anterior antennæ with the 2 prolonged apical setæ exceeding the stem of the antennæ by about half their length. Posterior antennæ with the outer ramus much



more slender and elongated than in female, with the 3rd joint twice as long as the 2nd and about equal in length to the remaining part of the ramus; inner ramus distinctly 3-articulate, middle joint slender and somewhat arcuate, with 3 subequal setæ anteriorly; last joint transformed to a falciform claw admitting of being impinged upon the middle one. Postoral limbs on the whole rather weaker in structure than in female. Copulative appendages comparatively small, each terminating in 3 incurved digitiform processes.

Body of female only slightly transparent, of a whitish grey colour with a more or less distinct yellowish brown tinge; that in male much more pellucid, the shell itself being almost colourless, whereas the enclosed body exhibits in some places a vivid orange hue.

Length of adult female amounting to 2.60 mm., of male to 2.50 mm.

*Remarks.*—The present species has by most recent authors been identified with *Cypridina brenda* of Baird; but it is very questionable if this identification is correct. Indeed Dr. Skogsberg has found the identification quite inadmissible, and has therefore proposed to retain the specific name given by Lilljeborg to the female sex. In accordance therewith the species is here recorded under the name by which it was designated by me in the year 1869. It is the type of the genus *Philomedes* and at the same time of the subfamily *Philomedinæ* proposed by Dr. Skogsberg.

*Occurrence.*—Females of this form are by no means rare of the Norwegian coast in moderate depths on a muddy bottom, and are noted from numerous localities, from the Christiania Fiord up to Finmark. The adult males are much more scarce, and are only quite occasionally captured. The behaviour of the two sexes is very different. Whereas the males are very active animals, swimming about with great speed, and in some cases even ascending to the very surface of the sea, the adult females are constantly bound to the bottom, dragging themselves slowly through the loose mud in search of food. This sluggish behaviour is due to the peculiar imperfectness of the natatory setæ on the posterior antennæ, rendering these limbs quite unserviceable for swimming. I have examined numerous specimens, and have almost constantly found these setæ broken in the very same manner. Only quite exceptionally I have met with one or other specimen with these setæ in an intact state, and such specimens had never ova and embryos in the breeding cavity, being in all probability still young and virginal. I think that the supposition set forth by G. W. Müller in this regard is very likely to be accepted, viz., that the above mentioned amputation of the natatory setæ is a voluntary act of the animal, these setæ being only of some use during the short period in which copulation

take place, but afterwards become useless or even inconvenient and therefore are bitten off by the aid of the strongly developed endopodal lobes of the anterior maxillipeds, which indeed seem to be pretty well adapted for such a purpose.

*Distribution*.—Kattegat, Skagerak, British Isles, Arctic Ocean: Newfoundland, Greenland, Jan Mayen, Spitsbergen, Franz Joseph Land, Kara Sea, Murman coast.

#### 4. *Philomedes* *Lilljeborgi*, G. O. Sars.

(Pl. VIII)

*Bradycinetus* *Lilljeborgi*, G. O. Sars. Oversigt af Norges marine Ostracoder. Chr. Vid. Selsk. Forh. 1865, p. 112.

*Specific Characters*.—*Female*. Shell, seen laterally, obtusely subquadrangular in outline, greatest height in the middle and about equalling  $\frac{2}{3}$  of the length, dorsal margin straight in the middle, but abruptly declining both in front and behind, ventral margin only slightly curved, posterior extremity scarcely broader than the anterior, and exerted below to a rather prominent triangular corner; seen dorsally or ventrally, oblong ovate in shape, about twice as long as broad, and having the posterior extremity more pointed than the anterior. Frontal incisure of valves occurring rather far below the longitudinal axis of the shell, and exhibiting a similar shape to that in the preceding species; rostral part however comparatively more prominent and strongly procumbent, being moreover almost transversely truncated at the end, with the upper angle very distinctly marked and the lower produced to a small procurved point; selvage of this part rather broad. Surface of shell smooth and almost quite devoid of hairs. Eyes, as in the female of the preceding species, imperfectly developed, and scarcely visible in the living animal. Structure of the several limbs very like that in *P. globosus*. Inner ramus of posterior antennæ, however, provided with 2 or 3 additional setæ on the anterior edge of the distal joint, and last pair of limbs having a much smaller number of cleaning spines, scarcely exceeding 11 on each limb.

*Male* of somewhat smaller size than female, and differing from it in a much similar manner to that in the preceding species, the shell being much narrower, oblong in shape, and more abruptly truncated behind, with the lower corner rather prominent. Frontal incisure of valves, as in the male of *P. globosus*, very shallow, and the rostral part bluntly rounded at the end. Eye large and conspicuous. Limbs transformed in the same manner as in the male of the preceding species.

Colour of female whitish grey, with a pale yellow tinge.



Length of female amounting to 2.50 mm.

*Remarks.*—The present form is closely allied to the type species, but of smaller size, and moreover easily distinguishable by the somewhat different shape of the shell, the posterior corner of which is in both sexes considerably more exerted. In the female, moreover, the rostral part looks rather different, being still more strongly procumbent and transversely truncated at the end.

*Occurrence.*—This is a true deep-water form, occurring, as a rule, only in depths below 100 fathoms. I have met with it occasionally in several places on the Norwegian coast, from the Christiania Fjord up to the Lofoten islands.

*Distribution.*—West coast of Sweden, Beeren Island, Iceland, Atlantic Ocean, down to 430 fathoms.

### Gen. 3. **Asterope**, Philippi, 1840.

*Syn.*: *Cylindroleberis*, Brady.

- *Copechæte*, Hesse.

*Generic Characters.*—Sexual dimorphism rather strongly marked. Shell in female of rather firm consistency and more or less oblong or elliptical in shape, with the frontal incisure of the valves very deep and narrow, arched over by the rather large and evenly vaulted rostral part. Shell of male much thinner and considerably differing in shape from that in female. Eyes in most cases well developed in both sexes. Frontal tentacle slender. Anterior antennæ 6-articulate and on the whole built on the same type as in the other Cypriidinidæ, though having the outer part in female broader, with the joints pronouncedly compressed and clothed with upturned ciliated setæ generally projecting from the shell in front; last joint small and provided, in addition to the setæ, with a short claw-like spine, seta attached to the posterior corner of antepenultimate joint in both sexes distinctly sensory; same antennæ in male transformed in a much similar manner to that in the genus *Philomedes*, 2 of the apical setæ being enormously prolonged. Posterior antennæ of quite normal structure, with the inner ramus in female very small and in male distinctly prehensile. Anterior lip small, lobular at the end. Mandibles with the masticatory process very slender, falciform, and ascending along the inner face of the basal part towards the gullet; palp rather powerfully developed, with the joints broad and compressed, the 1st produced at the base below to a conical recurved process clothed with several spiniform setæ; last joint armed with a straight, scarcely unguiform spine accompanied by a number of setæ. Maxillæ and maxillipeds rather feeble in structure and without any distinctly defined mastic-

atory lobes, the former limbs in particular exhibiting a rather anomalous appearance, each of them having the form of a somewhat curved attenuated stem provided at the base in front with a simple triangular lamella, and clothed along the inner face with a dense, comb-like series of delicate recurving setæ, the stem being terminated by a small decurved joint, apparently representing the endopodite, and tipped with 2 small bristles. Anterior maxillipeds provided at the base with the usual semilunar vibratory plate, their terminal part however far less complicated than in most other Cypridinids, forming a thin somewhat tortuous lamella fringed on the one edge with delicate ciliated setæ. Posterior maxillipeds almost wholly reduced to the triangular plate, by which these limbs in other Cypridinids are terminated, the plate being considerably more produced in front than behind and fringed with comparatively short setæ. Last pair of limbs exhibiting the characteristic vermiform shape common to all the Cypridinidæ. Caudal lamellæ comparatively small, but armed with rather strong curved claws rapidly increasing in size distally. Copulative appendages of male almost wholly confluent. Posterior part of body in both sexes provided dorsally with a double row of well developed imbricate gill-blads, 7 in each row.

*Remarks.*—This is a very distinct genus, differing in some respects so conspicuously from the other Cypridinidæ, that some recent authors (Brady & Skogsberg) have even removed it wholly as the type of a separate family. I think however that the present genus, in spite of these differences, ought more properly to be retained within the family Cypridinidæ, as the general type of that family is quite unmistakable both as regards the structure of the shell and the composition of the enclosed body, and also in the manner in which the two sexes differ from each other. Yet the establishment of a subfamily, *Asteropinæ*, for its reception may be well justified. The most striking feature distinguishing this genus is unquestionably the presence of true gills, of a structure similar to that found in the higher Crustacea. By this character indeed the present genus differs not only from the other *Cypridinidæ*, but from all hitherto known Ostracoda. The weak and apparently anomalous structure of the maxillæ and maxillipeds may be accounted for by the less rapacious nature of the animal. The genus *Cylindroleberis* of Brady, as admitted by that author, is identical with Philippi's genus, which was established at a much earlier date. Nor can I doubt that the genus *Copechæte* of Hesse ought to be adduced as a synonym, though Dr. Skogsberg, urging from some inaccurate and evidently erroneous statements given by Hesse, find the identification inadmissible.



A rather considerable number of species referable to this genus have been recorded in recent times from different parts of the Oceans. Most of these are so closely related, that their distinction is connected with no small difficulty; but there are also a few forms, which exhibit more conspicuous differences, and which on this cause have been removed as types of nearly allied genera, though the systematic rank of subgenera perhaps would be more appropriate. Two closely allied species, unquestionably referable to the present genus, are represented in the Fauna of Norway.

### 5. *Asterope mariæ* (Baird).

(Pl. IX, Pl. X fig. 1.)

*Cypridina mariæ*, Baird, Proc. Zool. Soc. London, part XVIII, p. 257, Pl. XVII, figs. 5—7.

Syn: *Cypridina oblonga*, Grube

- *Cylindroleberis mariæ*, Brady

- *Asterope norvegica*, G. O. Sars

- " *oblonga*, G. O. Sars

- *Cylindroleberis oblonga*, G. W. Müller

*Specific Characters.—Female.* Shell very narrow, almost cylindrical in shape, with the greatest height scarcely attaining half the length, dorsal and ventral margins only very slightly curved, both extremities obtusely rounded and nearly equal; — seen dorsally, narrow oblong in outline, with the greatest width about equalling  $\frac{2}{5}$  of the length. Frontal incisure of valves rather deep and narrow, occurring nearly in the middle of the anterior extremity; rostral part moderately broad and terminating below in a beak-like point. Surface of shell quite smooth and polished, without any obvious clothing of hairs. Eyes well developed, and easily observable in the living animal, though not of very large size. Inner ramus of posterior antennæ very small, 3-articulate, with only a single slender seta issuing from the tip. Last pair of limbs provided with only 12 cleaning spines. Caudal lamellæ with about 10 claws, the proximal ones very small, the others rapidly increasing in size distally.

*Male* very unlike the female in its outward appearance, and also of somewhat larger size. Shell, seen laterally, of a somewhat irregular oblong shape, being considerably higher in front than behind, with the dorsal margin slightly gibbous in front of the middle and the posterior extremity narrowly truncated; seen dorsally, much wider in front than behind. Frontal incisure of valves rather shallower than in female, and the rostral part more obtuse. Valves thin and pellucid, each clothed behind with a number of well-marked hairs, arranged in the manner as to form a wreath around the posterior end of the shell. Eyes rather larger than in female and very conspicuous in the living animal.

Anterior antennæ considerably more elongated than in female, with the outer part less pronouncedly compressed and the sensory seta much more fully developed, the 2 prolonged apical setæ almost attaining the entire length of the shell. Inner ramus of posterior antennæ with the middle joint about the length of the 1st and somewhat widening distally, carrying beyond the middle anteriorly 3 subequal setæ, terminal joint forming a somewhat compressed claw impinging upon the preceding joint. Structure of the remaining limbs almost exactly as in female. Copulative appendage divided at the end into 4 obtusely rounded lobules.

Colour in both sexes whitish grey.

Length of adult female amounting to 2.20 mm, of male to 2.40 mm.

*Remarks.*—As seen from the above-given list of synonymes, this form has been recorded under several different names. On a closer comparison I have convinced myself, that the form described by me in 1869 as *A. norvegica* is in reality identical with the British species *A. mariæ* (Baird), and that the Mediterranean form *A. oblonga* (Grube) is the same species. I should also be much inclined to believe, that the form recently recorded by Dr. Skogsberg as *A. Grimaldi* is not specifically distinct from the species here in question. How far the *Copechæte elongata* of Hesse, as believed by G. W. Müller, is identical with the present species, it is rather difficult to state with full certainty, though I regard the identity by no means as improbable.

The present species may be easily recognised by the unusually narrow, almost cylindrical shape of the shell in fully adult females. In younger specimens, however, the shell appears somewhat shorter and stouter, though otherwise agreeing with that in the adults. The male exhibits a much similar appearance to that of other species of the present genus.

*Occurrence.*—I have only met with this form quite occasionally, though in several places, both on the south and west coasts of Norway. It is generally found in depths ranging from 20 to 60 fathoms, on a muddy bottom, but never in any considerable number. Whereas the females almost constantly keep themselves close to the bottom, the much more agile males in some cases ascend to the very surface of the sea, being occasionally found among plankton taken by the aid of the tow-net.

*Distribution.*—West coast of Sweden, British Isles, coast of France, Mediterranean.



6. *Asterope abyssicola*, G. O. Sars.

*Asterope abyssicola*, G. O. Sars, Nye Dybvandscrustaceer fra Lofoten, Chr. Vid. Selsk. Forh. 1868, p. 170.

*Specific Characters.*—*Female*. Shell, seen laterally, of a somewhat irregular oblong oval shape, with the greatest height a little in front of the middle and exceeding half the length, dorsal and ventral margins gently curved, posterior extremity somewhat narrower than the anterior and obtusely rounded; — seen dorsally or ventrally, narrow oblong in outline, with the greatest width about in the middle and the anterior extremity somewhat narrower than the posterior. Frontal incisure of valves occurring rather far below the middle of the anterior extremity and rather deep; rostral part very broad and curving downwards. Surface of shell smooth and polished. Eyes quite inconspicuous in the living animal. Structure of the several appendages very like that in the preceding species; last pair of limbs however provided with a greater number of cleaning spines, amounting to 19 on each limb.

Colour uniformly whitish.

Length of shell 1.80 mm.

*Male* unknown.

*Remarks.*—In the shape of the shell this form resembles somewhat the Mediterranean species, *M. elliptica* Philippi. It is however of somewhat larger size and differs both from this and the other known species by the absence or at least quite rudimentary condition of the eyes. From the preceding species it is moreover distinguished by the considerably greater number of cleaning spines on the last pair of limbs.

*Occurrence.*—Two female specimens of this form were taken, many years ago, off the Lofoten islands at the considerable depth of 120 fathoms, muddy bottom. A 3rd female specimen was moreover obtained during the Norwegian North Atlantic Expedition at Stat. 290, located about midway between Finmark and Beeren Eyland, the depth being 191 fathoms. Out of Norway this form has not yet been recorded.

## Fam. 2. Conchoeciidæ.

(Halocypridæ auctorum)

*Characters of the family.* Shell of varying shape, with the valves, as a rule, very thin and pellucid, scarcely exhibiting any trace of calcination, frontal sinus generally well marked and arched over by 2 closely juxtaposed beak-like

rostral prominences. Eyes and ocellus wholly absent. Frontal tentacle, however, well developed, terminating, as a rule, in a more or less distinctly defined club-like dilatation. Anterior antennæ in female rather feeble and apparently immobile, carrying on the tip a fascicle of delicate sensory filaments, in male, as a rule, much more fully developed and freely mobile. Posterior antennæ powerfully developed and not essentially different in structure from those in the Cypridinidæ, inner ramus comparatively small, biarticulate, with the proximal joint bulbously dilated, the distal one small and tipped with a fascicle of sensory setæ, being in male moreover armed with an abruptly curved hook. Anterior lip more or less produced in front; posterior lip well marked, bilobed. Mandibles with the body well chitinated, wedge-formed, and terminating below in a complicated masticatory part; palp, as in the Cypridinidæ, large, subpediform, and abruptly bent in the middle, but without any distinctly defined exopodal appendage, its 1st joint produced at the base below to a toothed lobe adjoining the masticatory part of the mandibles. Maxillæ built on the very same type as in the more normal Cypridinidæ, though having the outer 2 masticatory lobes coalesced. The 3 succeeding pairs of limbs more deviating in structure and more or less pediform, the anterior pair being however subservient to mastication, and thus more properly termed maxillipeds; last pair very small, not vermiform. 2 pairs of trilobate vibratory plates present, attached to the bases of the maxillipeds and the anterior legs, the latter limbs more or less transformed in male. Caudal lamellæ more or less rounded in shape, with one of the claws inserted to a ledge of the anterior edge and more slender than the others. Copulatory appendage of male single, sinistral. Ripe ova, as a rule, not received within the cavity of the shell (sole exception *Euconchoecia*).

*Remarks.*—The present family is a very sharply defined one, exhibiting some apparently rather essential differences from the *Cypridinidæ*, though evidently belonging to the same chief division. The proposal set forth by Dr. Skogsberg, to remove this family wholly from the *Myodocopa* as a distinct suborder, I am quite unable to approve. In my opinion the 2 families *Cypridinidæ* and *Conchoeciidæ* form together a very well defined and quite natural group of Ostracoda, to which alone the systematic rank of a true suborder can be assigned. Indeed, I think it may clearly appear from the diagnosis given above of the *Myodocopa*, that all the fundamental characters by which this suborder distinguishes itself from any of the 3 other suborders here recorded, are equally well applicable to the *Conchoeciidæ* as to the *Cypridinidæ*. As I am of opinion, that the several families in which the *Cypridinidæ* has been



divided by recent authors, more properly only deserve the systematic rank of subfamilies, and no such division has been carried out of the *Conchoeciidae*, I have come to the result, that only 2 true families are to be distinguished within the suborder *Myodocopa*. The one of these families has been treated of in the preceding pages, the other is that here in question. As to the name of the family, I think that the one here given and proposed by me in the year 1865, ought to be preferred to that generally used by recent authors, *Halicypriidae*. For, according to the general law in Zoology, the family-name should always be derived from that of the genus at first established, and the generic name *Conchoecia* was in reality proposed by Dana 2 years previous to that of *Halocypris*.

All the forms belonging to the present family lead a true pelagic life, occurring not seldom in shoals near the surface of the sea, in other cases however only at greater depths; but they are never so strictly bound to the bottom as is the case with the *Cypridinidae*. The weak consistency of the shell, in connection with the very powerfully developed swimming antennæ, seems indeed to be very apt for facilitating the free movements of the animal.

To the 2 genera, *Conchoecia* and *Halocypris* originally established by Dana, a limited number of additional genera have been recorded in recent times, most of them closely allied to the first-named genus and in some cases only founded on slight differences in the shape of the shell. Only the typical genus is represented in the Fauna of Norway.

#### Gen. 4. **Conchoecia**, Dana, 1849.

*Generic Characters*.—Shell more or less elongate in shape and not very tumid, with the dorsal face almost plain and continued anteriorly in the beak-like rostral projections; subjacent sinus well marked and rather wide. Surface of shell without any obvious clothing of hairs, in some cases apparently quite smooth, but more generally sculptured with delicate curved striæ often crossing each other, so as to form a more or less dense net-work. Anterior antennæ in female straight, sub-cylindrical, imperfectly jointed, carrying on the tip a bundle of generally 4 subequal sensory filaments accompanied in front by a slender upward-curving seta; those in male much larger, and distinctly 4-articulate, with the apical appendages conspicuously transformed. Posterior antennæ with the basal part exceedingly large, obpyriform in shape, outer ramus 7—9-articulate, with the 1st joint more than twice as long as the

remaining joints combined, all the natatory setæ terminating in a thin lanceolate point; inner ramus with the proximal joint remarkably expanded behind and produced anteriorly into 2 successive mamilliform processes, the lower of which is tipped with 2 short bristles; distal joint in male with 2 of the apical setæ much elongated, and the hook constantly more strongly developed on the right than on the left antenna. Anterior lip forming in front a large, hood-like prominence. Maxillipeds with the basal part produced anteriorly to a well-marked masticatory prominence, palp 3-articulate and rapidly tapered distally, its last joint very small and armed with 3 slender anteriorly curved claws of unequal length. Anterior legs slender, 5-articulate, their outer part being in female of a similar structure to that of the palp of the maxillipeds and generally projected from the shell below; those in male conspicuously transformed, being more powerfully developed and as a rule, concealed within the shell, terminating in 3 subequal, densely crowded setæ more or less abruptly bent in their outer part, and generally projecting from the shell, at its upper posterior corner. Posterior legs very small, imperfectly biarticulate, and terminating in 2 slender setæ, the one of which is very elongate. Caudal lamellæ, each armed anteriorly with a slender spine, curving downwards in front of the marginal claws. The latter somewhat compressed and gradually diminishing in size proximally. Copulatory appendage in male oblong in shape and scarcely lobular at the end.

*Remarks.*—This genus was established as early as the year 1849 by Dana, and was subsequently divided by the same author into the 2 genera *Conchoecia* (proper) and *Halocypris*, both being comprised within the subfamily *Halocyprinæ*, which together with the subfamily *Cypridininae* constituted his family *Halocypridæ*. The genus may be easily distinguished from *Halocypris* by the more elongated and far less tumid shell, as also by the very distinct rostral prominences of the same. It comprises numerous species from nearly all parts of the Oceans explored. To the Norwegian Fauna belong 3 well defined species, to be described in the sequel.

### 7. *Conchoecia elegans*, G. O. Sars.

(Pl. XI & XII).

*Conchoecia elegans*, G. O. Sars, *Oversigt af Norges marine Ostracoder*, p. 117.

Syn: *Paraconchoecia gracilis*, Claus.

- *Conchoecia quadrangularis*, Aurivillius.

*Specific Characters.*—*Female*. Shell rather slender and elongated, seen laterally, almost cuneiform in shape, being gradually narrowed from behind



forwards, greatest height quite behind and scarcely exceeding  $\frac{2}{5}$  of the length, dorsal margin straight and horizontal, ventral slightly arcuate and ascending in front, posterior extremity broadly truncated, with the upper angle well marked, lower rounded off;—seen dorsally or ventrally, narrow oblong in outline, tapering more in front than behind, greatest width behind the middle and but little exceeding  $\frac{1}{3}$  of the length. Rostral projections rather prominent and somewhat vaulted above, subjacent sinus very wide, seen laterally almost rectangular. Surface of shell exhibiting a very delicate decussated sculpture; right valve with the upper posterior corner produced in a spiniform point, in front of which 2 recurved denticles of the dorsal edge are always found. Anterior antennæ scarcely reaching beyond the basal part of the posterior ones, and exhibiting within their proximal part a number of dark yellow corpuscles, also found in other species, and apparently visual in nature. Posterior antennæ with the basal part almost attaining half the length of the shell, outer ramus 7-articulate, inner ramus with 5 apical setæ, one of them somewhat more elongate than the others, which are all distinctly sensory. Frontal tentacle only slightly dilated at the end and projecting a little beyond the anterior antennæ. Caudal lamellæ with the deflexed spine of the anterior edge rather slender, claws of moderate length, 7 in number on each lamella, and gradually diminishing in size proximally.

*Male* of nearly same size as female and only slightly differing in the shape of the shell, though having the anterior part somewhat wider and the upper posterior corner less prominent. Anterior antennæ rather unlike those in female, being much larger and divided into 4 well defined joints, the 2nd of which is somewhat dilated at the base and filled with strong muscles acting upon the 2 small terminal joints, 3 of the apical appendages much prolonged, setiform, the other 2 sensory and very unequal in size, the anterior one being very small, the posterior elongated and extending backwards along the stem of the antenna, outermost seta exhibiting, somewhat beyond the middle, a peculiar dilatation in the form of a small oval disk finely striated radially and apparently suckorial in nature. Inner ramus of posterior antennæ with 2 of the apical setæ much elongated; prehensile hook well developed on the right antenna, but much reduced on the left. Frontal tentacle with the extremity conspicuously more dilated than in the female. Copulatory appendage of moderate size, with the outer part slightly dilated and compressed.

Shell in the living animal very transparent, pale straw-coloured, enclosed body of a darker hue and in some places exhibiting a more or less conspicuous reddish brown pigment.

Length of adult female amounting to 2.30 mm., that of male about the same.

*Remarks.*—The present species may be easily recognised from its nearest allies by the comparatively very narrow, almost cuneiform shape of the shell and by the rather prominent dentated upper posterior corner. The form recorded by Claus as *Paraconchoecia gracilis* is unquestionably identical with the present species, and this is also the case with *Conchoecia quadrangularis* of Aurivillius, this species being only founded on immature specimens of *C. elegans*. On the other hand it seems to me rather questionable, if the form taken in the antarctic Ocean, and recorded under the latter name, is in reality identical with the northern form, though the identity has been admitted by Dr. Skogsberg.

*Occurrence.*—I have met with this handsome species in several places on the Norwegian coast, from the Christiania Fjord up to the Lofoten islands, but, as a rule, only in greater depths beyond 100 fathoms. The most suitable method for catching it, is to attach a tow-net to the dredging line, at some distance from the dredge or from a heavy lead to be dragged along the bottom. In the tow-net thus several bathypelagic animals will be collected, and among them the present Ostracod may often be found in great numbers. The movements of the animal are exceedingly rapid and effected in abrupt bounds. I have not observed any phosphorescence in the specimens examined by me in the living state.

*Distribution.*—West coast of Sweden (Skogsberg), British Isles (Brady), Arctic Sea (Aurivillius) Atlantic Ocean (Claus).

## 8. *Conchoecia borealis*, G. O. Sars.

(Pl. XIII, fig. 1).

*Conchoecia borealis*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 119.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong subquadrangular in outline and rather expanded behind, greatest height nearly attaining half the length, dorsal margin horizontal with a slight depression in the middle, ventral margin strongly curved in its posterior part, but in front of the middle more or less distinctly sinuated, posterior extremity broadly truncated, with the lower corner evenly rounded off, the upper not produced, obtuse;—seen dorsally, oblong oval in shape, with the greatest width about in the middle and somewhat exceeding  $\frac{1}{3}$  of the length, anterior extremity sub-truncate at the end, posterior much contracted. Rostral projections rather smaller than in the preceding species and less vaulted above, subjacent sinus about as in that



species. Dorsal face of shell flattened in its anterior half, or even somewhat excavated, the excavation being defined on each side by an obtuse keel. Surface of valves distinctly decussated by sharply marked striæ crossing each other and forming a very conspicuous net-work of quadrangular meshes, in some places assuming a somewhat squamiform appearance; upper posterior corner of each valve armed, somewhat within the edge, with 4 or 5 rather strong deflexed denticles. Frontal tentacle more fully developed than in *C. elegans*, with the extremity conspicuously club-shaped and finely hairy. Structure of the several limbs very little different from that in the preceding species. Caudal lamellæ with the 3 anterior claws rather slender and elongate, the remaining 4 claws abruptly much shorter.

*Male* of rather smaller size than female, and having the shell comparatively narrower and more distinctly sinuated below. Frontal tentacle with the club-shaped extremity sharply defined behind, so as to form a well marked capitulum. Outermost apical seta of the anterior antennæ considerably longer than the others and abruptly bent near the end, the middle part of the seta being somewhat thickened and armed posteriorly with a dense series of recurved somewhat squamiform spinules; posterior reflexed sensory filament tortuous in a peculiar manner. Hook on the inner ramus of right posterior antenna comparatively much larger than in the male of *C. elegans*.

Shell in the living animal rather pellucid, with only a very slight pale yellow tinge; enclosed body exhibiting in some places a bright reddish orange pigment.

Length of adult female amounting to 2.80 mm.; that of male scarcely exceeding 2.30 mm.

*Remarks.*—The present species is easily distinguishable from the preceding one, and has even by G. W. Müller been placed within a separate group of the genus, the so-called mollis-group. I think however that such a sharp distinction of these 2 species may scarcely be justified, as both on the whole agree rather closely in almost all structural details. Yet the specific difference is well expressed both in the general outward appearance and in the sculpture of the shell.

The form recorded by G. W. Müller from the antarctic Ocean under the name of *C. antipodum*, is closely allied to the present species, and has indeed been regarded by Dr. Skogsberg as only a variety. The same belief is also expressed by that author as regards the arctic form, *C. maxima*, Brady & Norman. I feel however great hesitation in approving these views.

*Occurrence.*— This form was first detected by the present author off the

Lofoten islands, where it occurred, together with *C. elegans*, at the considerable depth of 250—300 fathoms. I have subsequently taken it occasionally in the greater deeps of the Christiania Fjord, at Vallø and Hankø, and it has also been recorded by Norman from the Trondhjem Fjord.

*Distribution*.—West coast of Sweden (Skogsberg), Arctic Ocean (Aurivillius), Labrador current (Vávra).

### 9. *Conchoecia obtusata*, G. O. Sars.

(Pl. XIII, fig. 2).

*Conchoecia obtusata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 118.

*Specific Characters*.—*Female*. Shell, seen laterally, oblong oval in shape, and scarcely broader behind than in front, greatest height about in the middle and nearly attaining half the length, dorsal margin perfectly straight and horizontal, ventral margin evenly arcuate throughout, posterior extremity narrowly rounded and somewhat prominent in the middle; upper posterior corner rather slight and quite unarmed;—seen dorsally or ventrally, narrow oblong in outline, greatest width behind the middle and somewhat exceeding  $\frac{1}{3}$  of the length. Rostral prominences of moderate size and somewhat deflexed, subjacent sinus comparatively narrower than in the 2 preceding species. Surface of valves nearly smooth, though a slight concentric striation may be discerned in their marginal parts. Structure of the several appendages very little different from that in the 2 preceding species.

*Male* much smaller than female, and having the shell comparatively shorter and stouter. Frontal tentacle with a well defined capitulum. Foremost apical seta of the anterior antennæ, as in the male of *C. borealis*, abruptly bent near the end, and having the middle part somewhat thickened, but only armed with scattered very small and simple spinules; posterior sensory appendage distinctly flexuous. Hook on the inner ramus of right posterior antenna of quite an extraordinary size, and exhibiting at some distance from the base an abrupt elbow-like bend, its outer part forming on the middle another though more even curvature; that on the left antenna, as usual, much reduced in size. Copulatory appendage comparatively larger than in either of the 2 preceding species, but otherwise of a very similar appearance.

Colour of female specimens whitish grey, with a pale yellow tinge.

Length of adult female amounting to about 2 mm.; that of male only to 1.40 mm.

*Remarks*.—This form cannot be confounded with any of the 2 preceding



ones, the shell differing conspicuously both in shape and in sculpture. It is however a true member of the present genus, and my reference of it in the year 1890 to the genus *Halocypris* has turned out to be quite erroneous. I was led to this supposition by a certain similarity in the shape of the shell with a small Mediterranean form, which, on the authority of Claus, I took for a member of Dana's genus, and which was described in my treatise on the Mediterranean Ostracoda under the name of *Halocypris Clausi*. This form is however not at all a *Halocypris*, but the type of a genus, or more properly subgenus, closely allied to *Conchoecia* (*Microconchoecia* Cl.).

The present species also has its representative in the Antarctic Ocean, a form being found there, which so closely resembles the northern species, that it has been considered both by G. W. Müller and Dr. Skogsberg to be identical with that species, only representing a slight variety (*antarctica*). I must however confess my doubt on the correctness of this identification.

*Occurrence.*—Of this species at first only 2 female specimens were found, the one at Flekkefjord, south coast of Norway, the other in the Trondhjem Fjord. I have subsequently met with this form occasionally in 2 other localities, viz., at Risør, and in the middle part of the Christiania Fjord, at Hankø. In the last-named locality it occurred together with *C. elegans* at a depth of about 100 fathoms, in the other 3 localities it was found in rather shallower water.

*Distribution.*—West coast of Sweden (Skogsberg), North Atlantic Ocean (Våvra).

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## Suborder 2.

### Cladocopa.

*General Characters.*—Shell without any persistent aperture in front, the valves admitting of being perfectly closed all around. Both pairs of antennæ distinctly natatory, the posterior ones having both rami developed for that purpose. Mandibles with the palp of weak structure and not at all pediform, nor clawed at the tip. 2 pairs only of postoral limbs present, the anterior ones, representing the maxillæ, largely developed, biramous, and partly natatory; posterior pair (maxillipeds) of a much more delicate structure and chiefly subservient to respiration. Posterior part of body strongly deflexed, and terminating in 2 short and broad juxtaposed lamellæ, edged below with claw-like spines, behind which an unpair, small setiform process occurs. Heart and visual organs wholly absent. Frontal tentacle replaced by 2 juxtaposed ciliated setæ.

*Remarks.*—This suborder was proposed in the year 1865 by the present author, to include the very anomalous, and at that time wholly unknown genus *Polycope*, the type of the family *Polycopidæ*. I am still fully convinced, that this suborder ought to be supported, and that the classing of the family *Polycopidæ* within the suborder *Myodocopa*, as proposed by G. W. Müller, is quite inadmissible. True, a slight tendency towards the *Myodocopa* type may be found as regards the structure of the posterior antennæ and in particular the shape of their outer rami; but otherwise the differences are much to great as to allow a closer association of that family to the *Myodocopa*. This has also been fully conceded by the most recent author, Dr. Skogsberg, who has restored this suborder, though under a different name viz, *Polycopiformes*. The suborder comprises a yet only a single family, the general characters of which are given below.

## Fam. Polycopidæ.

*Characters of the family.*—Shell of more or less rounded shape, with the valves subequal and wanting any obvious clothing of hairs. Anterior antennæ very movably connected with the body and of somewhat varying structure, but always tipped with a fascicle of long natatory setæ. Posterior antennæ with the basal part rather thick and muscular, though less so than in the *Myodocopa*, rami not very unequal in size and both provided with long natatory setæ. Anterior lip comparatively small. Mandibles with the body well defined and the masticatory part abruptly incurved, palp only composed of 2 distinctly defined lamellar joint, the proximal one carrying at the end anteriorly a small exopodal appendage. Maxillæ with the basal part divided into 2 segments, the 1st provided inside with a well defined masticatory lobe, the 2nd with 2 much smaller setiferous lobes; terminal part, constituting the palp, large and compressed, being divided at the end into 2 deflexed rami, the inner 3-articulate and clothed inside with numerous recurved, partly spiniform setæ, outer ramus much narrower, and not distinctly articulated, but tipped with a dense fascicle of natatory setæ. Maxillipeds lamellar in structure and each divided into 3 more or less distinctly defined segments rapidly diminishing in size, the 1st rather large and provided outside with a well developed semilunar vibratory plate, 2nd segment subtriangular in shape, with a small setiferous lobe at the end outside, last joint very small and in some case not distinctly defined. None of the limbs transformed in male. Caudal lamellæ with the claws inserted within more or less deep incisions of the margin, left lamella in male more or less conspicuously transformed and contributing to the formation of the very complicated and pronouncedly asymmetrical copulatory apparatus.

*Remarks.*—This family was proposed by the present author for the reception of the genus *Polycope*, the only one at first known. In the year 1894 another genus, *Polycopsis*, referable to the same family, was added by G. W. Müller, and I regard it as very probable, that the number of genera will be still more increased in future. Both of the above mentioned genera are represented in the Fauna of Norway.

### Gen. 1. *Polycope*, G. O. Sars, 1865.

*Generic Characters.*—Shell, as seen laterally, more or less perfectly orbicular in shape, with the 2 extremities very little dissimilar, the anterior one being however in most cases somewhat more bowed in the middle than the



posterior. Valves generally thin and pellucid, with the surface in some cases quite smooth, in other cases closely punctate or reticulate, lower edges scarcely serrate, but, as a rule, fringed with very small and delicate spinules. Anterior antennæ each composed of 4 rather unequal joints, the first 2 very obliquely connected with each other, 2nd joint considerably dilated at the base and filled with strong muscles acting upon the small terminal part of the antenna, its upper edge provided in the middle with a slender anteriorly-pointing seta; 3rd joint very movably articulated to the preceding joint and carrying a small bristle at the end anteriorly; last joint so extremely small as only with difficulty to be discerned, and tipped with 4 exceedingly long and slender-subequal natatory setæ. Posterior antennæ with the outer ramus 8—9 articulate, and resembling in structure that in the *Myodocopa*; inner ramus not much shorter than the outer and 3-articulate, with the 1st joint naked and much larger than the other 2, which are densely clothed with natatory setæ of the same appearance as those on the outer ramus. Anterior lip rounded in front. Mandibles with the cutting edge divided into 4 or 5 unequal teeth, proximal joint of palp forming behind a rounded lobe clothed with 4 plumose setæ, distal joint blunted at the end, and provided with 4 slender apical setæ arranged in pairs. Maxillæ with the rami of about equal length. Maxillipeds with the terminal joint well defined and tipped with a single seta. Caudal lamellæ in female without any denticles of the anterior edge; left lamella in male sending off from the base anteriorly a more or less produced spiniform process adjoining the copulatory apparatus.

*Remarks.*—Of this remarkable genus at first only a single species was found, described by the present author in the year 1865 under the name of *P. orbicularis*. In the next following years, however, 2 other nearly-allied species were added, and in recent times the number of species has been considerably increased by other authors. Thus G. W. Müller records from the Mediterranean no less than 9 different species referred by him to this genus. Some of these, in particular the 3 species, *P. dentata*, *rostrata* and *tuberosa*, seem however to me to differ so conspicuously from the typical species, both in the general appearance and in the rough sculpture of the shell, that they perhaps more properly should be placed within a separate genus. On a closer examination of the material in my possession, I have been enabled to increase the number of Norwegian species referable to the present genus to 6 in all.



1. *Polycope orbicularis*, G. O. Sars.

(Pl. XIV, Pl. XV, fig. 1)

*Polycope orbicularis*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 122.

*Specific Characters. Female.*—Shell rather tumid, seen laterally, nearly circular in outline, greatest height in the middle and but little inferior to the length, dorsal margin strongly and somewhat angularly arched in the middle, ventral margin forming a more even and rather bold curve, anterior extremity bluntly rounded, with a slight indication to an angle above; — seen dorsally rather broad, almost rhomboidal in outline, the lateral edges being abruptly curved in the middle, greatest width about equalling  $\frac{2}{3}$  of the length, anterior extremity somewhat more pointed than the posterior. Valves thin and fragile, though somewhat thickened along the dorsal face; ventral margin exhibiting a narrow hyaline border crossed by a number of very small and delicate spinules. Surface of valves finely punctate and moreover exhibiting a very delicate reticulate pattern of polygonal meshes. Caudal lamellæ each armed with 7 claws finely ciliated behind and gradually diminishing in size proximally, all the claws being inserted within deep incisions of the margin, which projects between them as rather prominent triangular processes.

*Male* somewhat smaller than female, but otherwise very similar in its outward appearance. Left caudal ramus conspicuously transformed; outermost claw replaced by a thin bristle inserted high up on the side of the lamella, subjacent excavation rather wide, with the anterior defining angle digitiform produced; anterior upturned process broad at the base but rapidly tapered distally and terminating in a tridentate point. Copulatory apparatus of such a complicated structure as only with difficulty to be described in detail, its most conspicuous part being a rather large piece, on the left side, curving upwards in close approximation to the above-mentioned process of the corresponding caudal lamella, and terminating in a somewhat dilated bilobular extremity.

Colour of shell pale yellow, variegated with irregular reddish orange patches radiating from the centre of each valve towards the margins.

Length of adult female amounting to 0.70 mm; that of male to 0.50 mm.

*Remarks.*—This species, being the first described, ought of course to be regarded as the type of the present genus. It seems to me somewhat questionable, if the form recorded under this name by Brady in his Monograph of the recent British Ostracoda is the same species, as the figure he gives of the shell, as seen dorsally, is rather different. On the other hand, the figures given

in the subsequent work published by him in connection with Norman, are unquestionably referable to the present species.

*Occurrence.*—This peculiar little Ostracod is by no means rare off the coast of Norway. I have taken it in many different places, both on the south and west coasts, from the Christiania Fjord at least to Trondhjem. It generally occurs at moderate depths ranging from 6 to 20 fathoms, on a sandy bottom covered with a thin layer of mud. The animal moves rather lively along the bottom in a peculiar manner reminding somewhat on that of some Lynceidæ (*Chydorus sphaericus*). During the swimming the slender natatory setæ attached to both pairs of antennæ and to the outer ramus of the maxillæ are seen projecting from the shell anteriorly as dense diverging fascicles, which are moved rapidly in a vertical plane, as in the *Cypridæ*. When disturbed, the animal at once withdraws its swimming appendages within the shell, the valves of which then become firmly closed.

*Distribution.*—British Isles (Brady).

## 2. *Polycope punctata*, G. O. Sars.

(Pl. XV, fig. 2).

*Polycope punctata*, G. O. Sars, Nye Dybvandscrustaceer fra Lofoten.  
Chr. Vid. Selsk. Forh. 1819, p. 171.

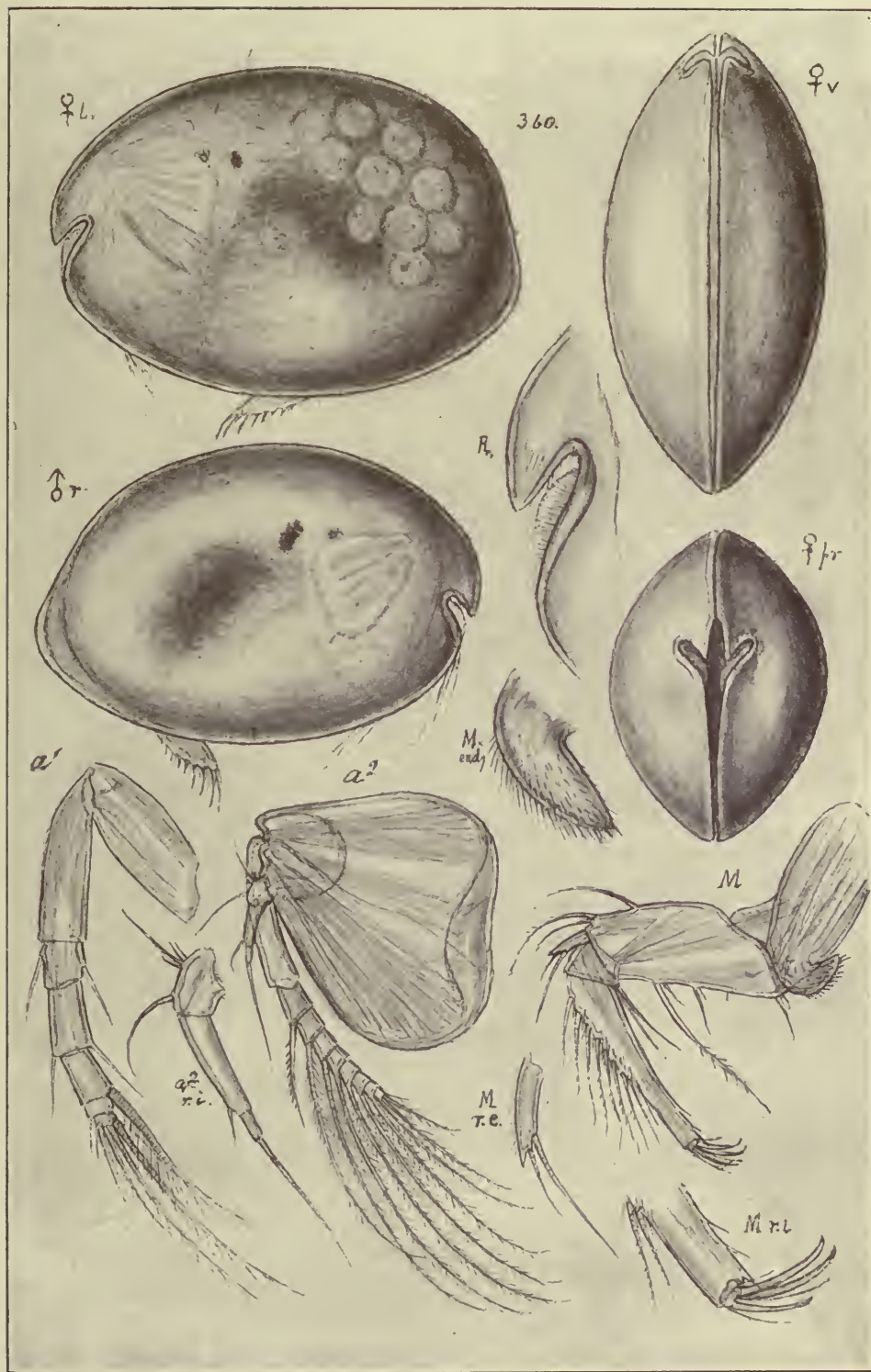
*Specific Characters.*—*Female.* Shell, seen laterally, resembling in shape that of the preceding species, though having the margins somewhat more regularly curved;—seen dorsally, very broad, the greatest width attaining  $\frac{3}{4}$  of the length. Surface of valves sculptured with densely set and rather conspicuous pits, but without any trace of a reticulation. Anterior antennæ less densely hairy than in the preceding species, with the penultimate joint comparatively larger. Mandibular palp with the posterior lobe of the proximal joint somewhat more prominent, and the distal joint broader, almost quadrangular in shape; exopodal appendage only provided with a single thickish seta, another small, but distinctly ciliated seta issuing just behind it from the outer distal corner of the joint. Structure of the limbs otherwise very like that in the preceding species. Caudal lamellæ however somewhat dissimilar, being more triangular in shape, with the lower edge almost straight and the anterior corner rather produced; claws, as in *P. orbicularis*, 7 in number on each lamella, intercurring projections of the margin, however, much smaller than in that species.

*Male* closely resembling the female in its outward appearance, though of somewhat smaller size. Left caudal lamella with the anterior corner not at



## Myodocopa

Pl. 1



Cypridina norvegica, Baird





# Ostracoda

Cypridinidæ

Myodocopa

Pl. II



G. O. Sars del.

*Cypridina norvegica*, Baird  
(continued)

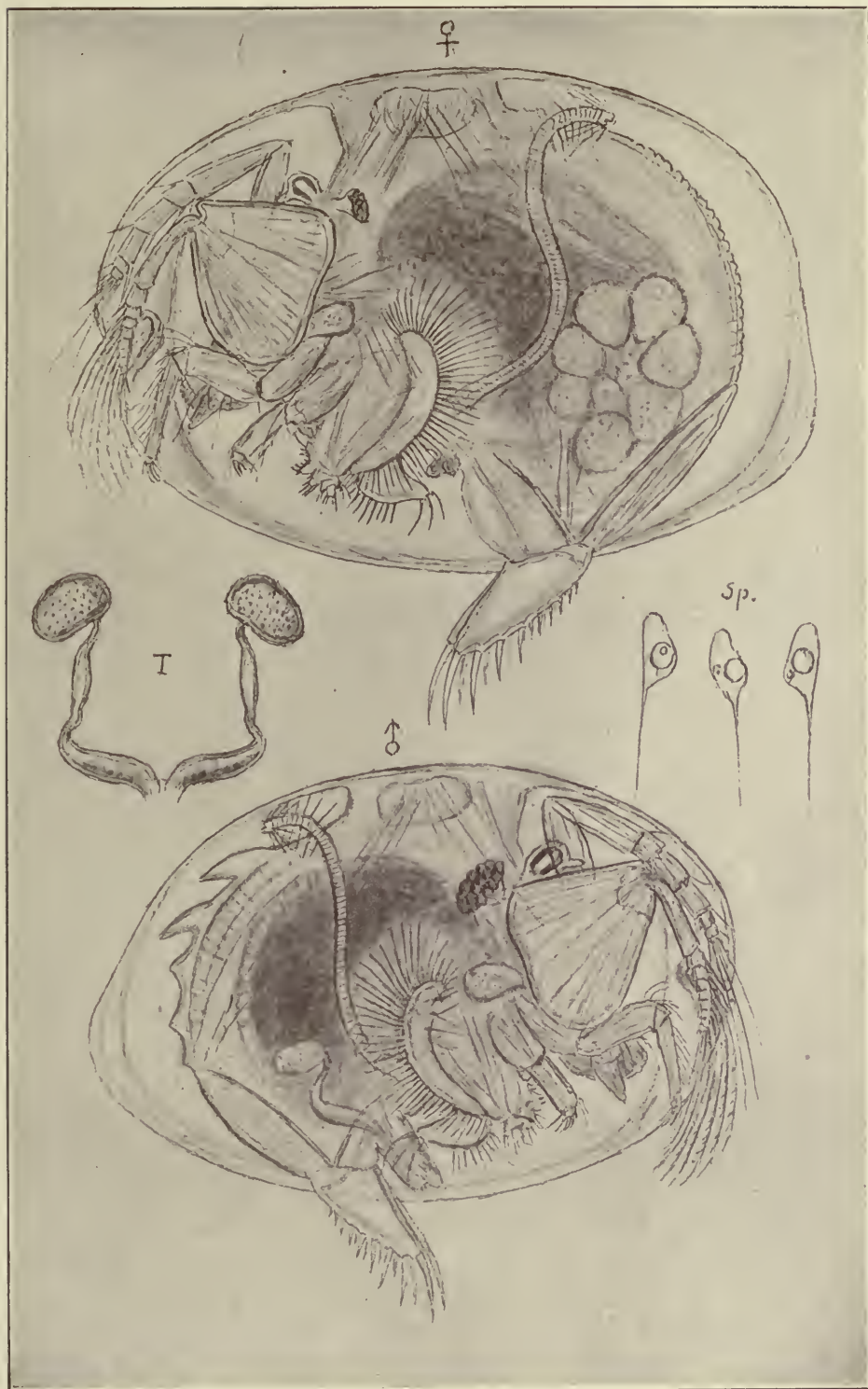


# Ostracoda

Cypridinidæ

Myodocopa

Pl. III



G. O. Sars del.

*Cypridina norvegica*, Baird  
(continued)



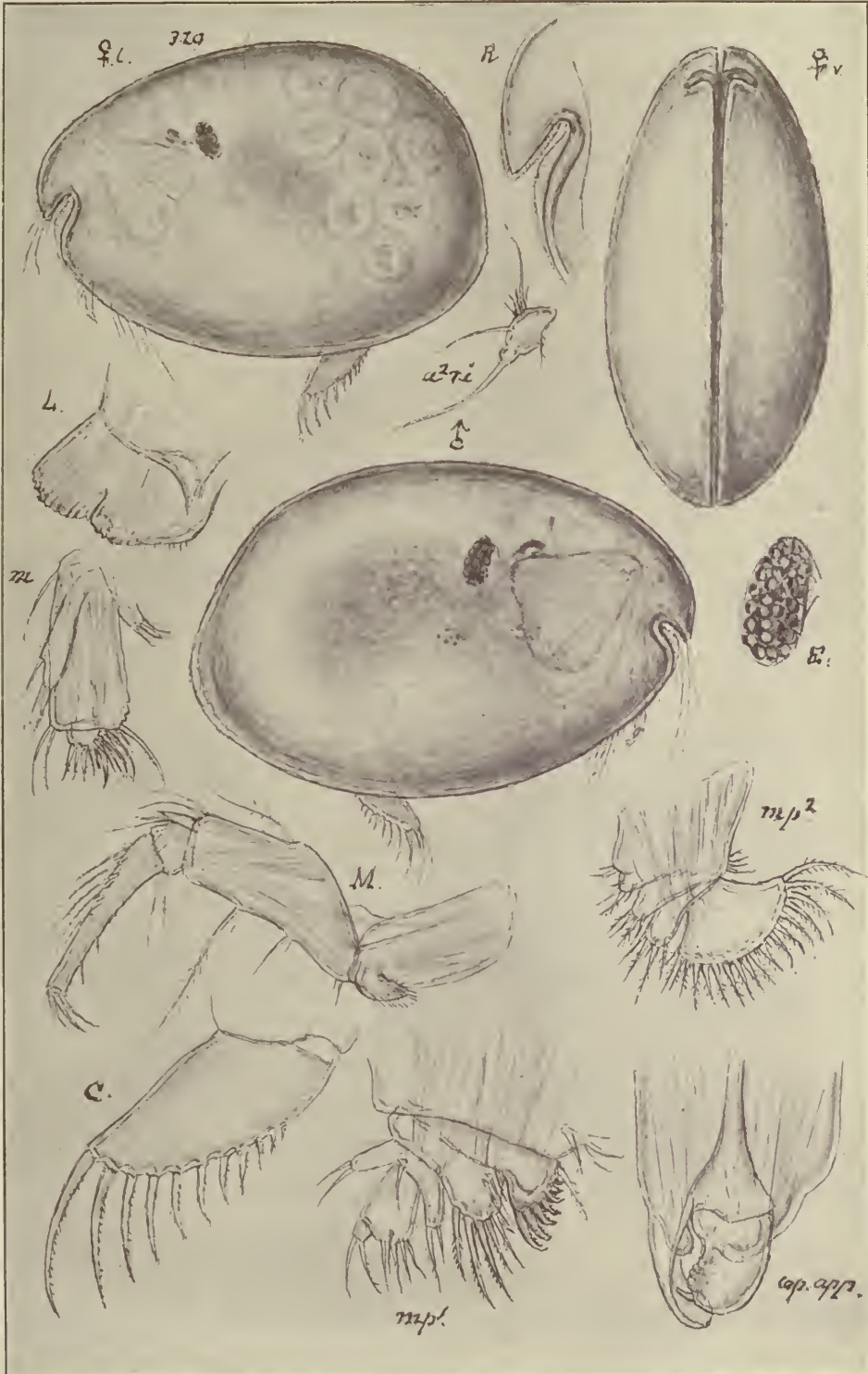


# Ostracoda

Cypridinidae

Myodocopa

Pl. IV



G. O. Sars del.

*Cypridina megalops*, G. O. Sars

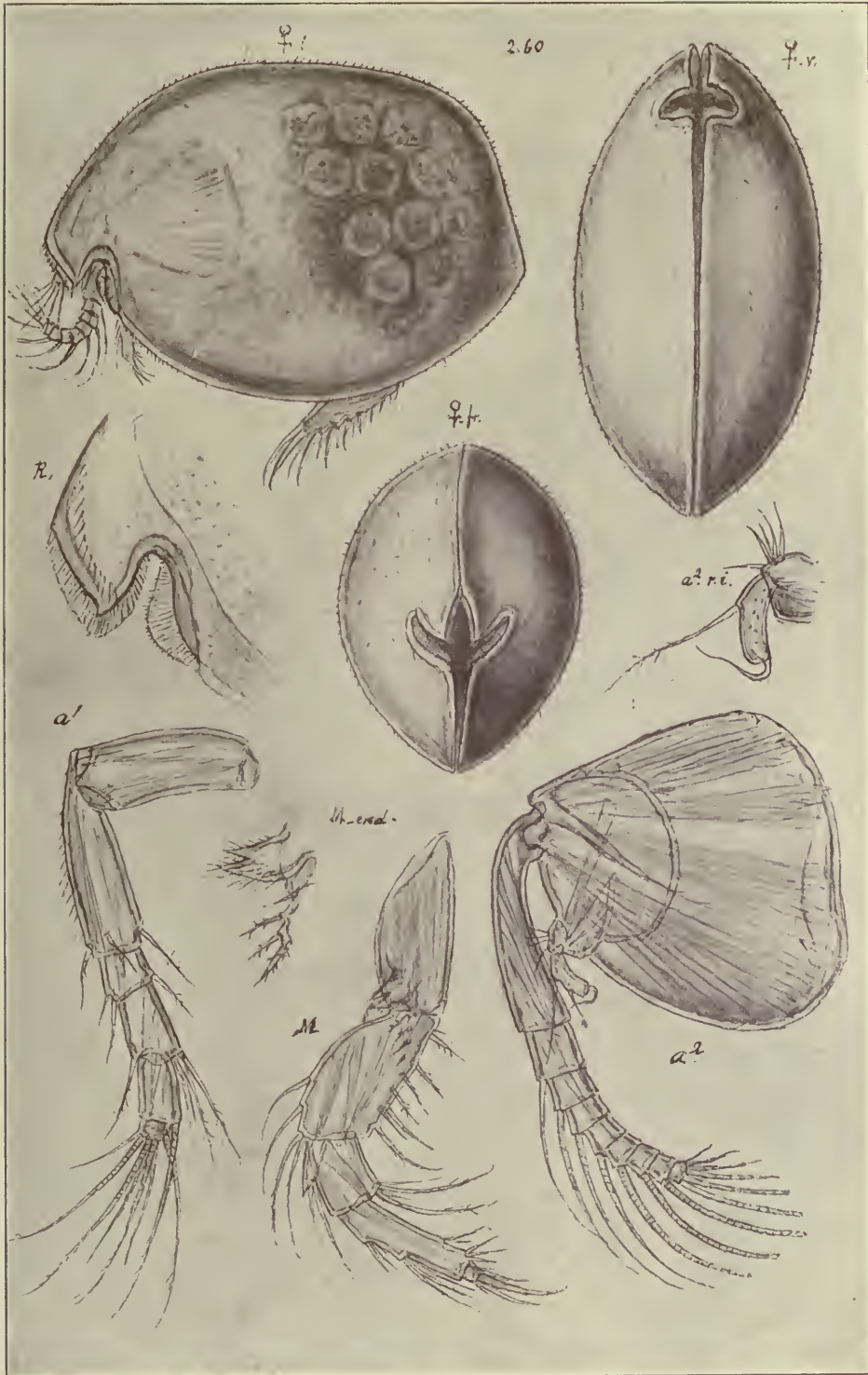


# Ostracoda

Cypridinidæ

Myodocopa

Pl. V



G. O. Sars del.

*Philomedes globosus*, (Lilljeborg)



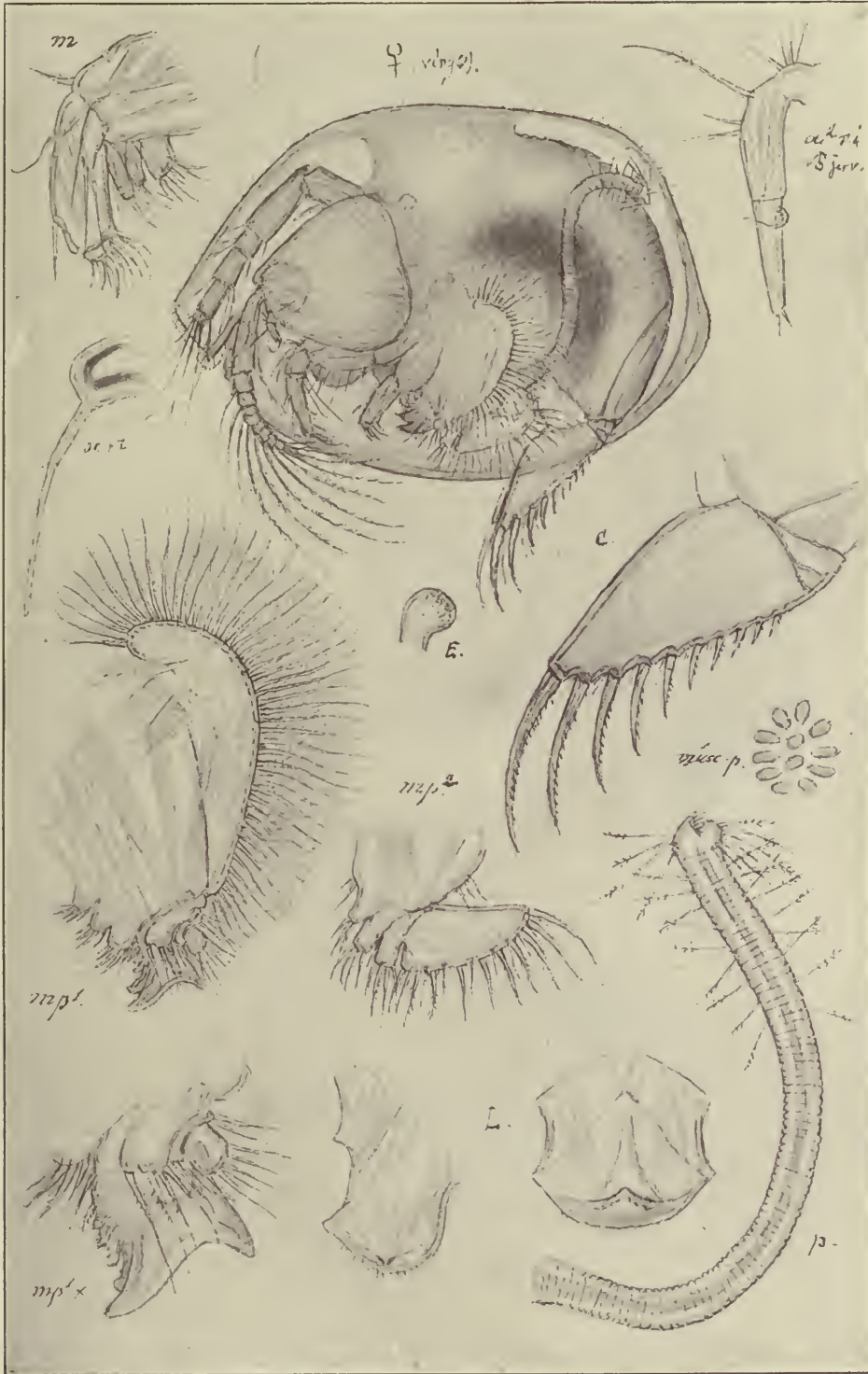


# Ostracoda

Cypridinidæ

Myodocopa

Pl. VI



G. O. Sars del.

*Philomedes globosus*, (Lilljeb.)  
(continued)

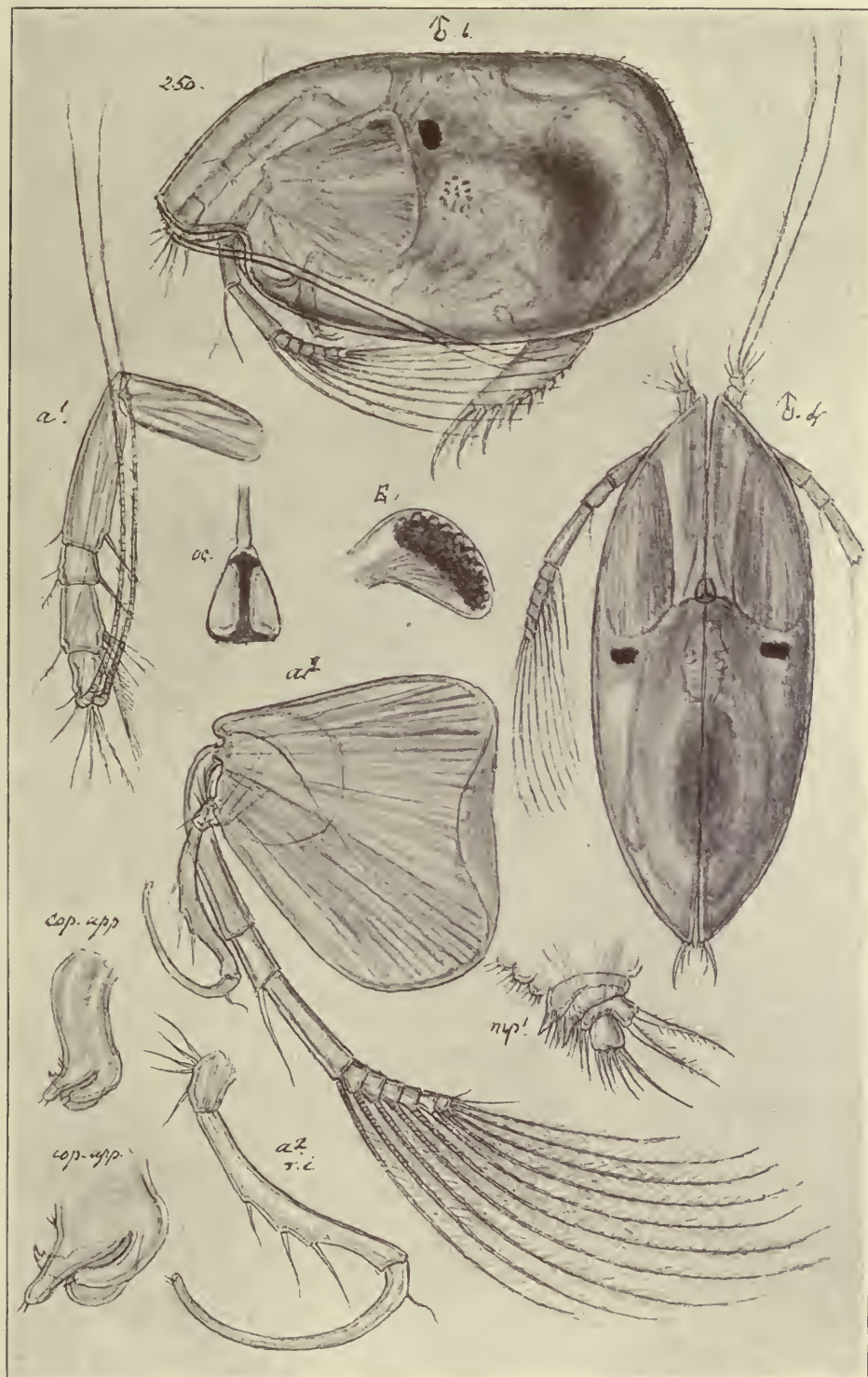


# Ostracoda

Cypridinidæ

Myodocopa

Pl. VII



G. O. Sars del.

*Philomedes globosus* (Lilljeb.)  
(male)



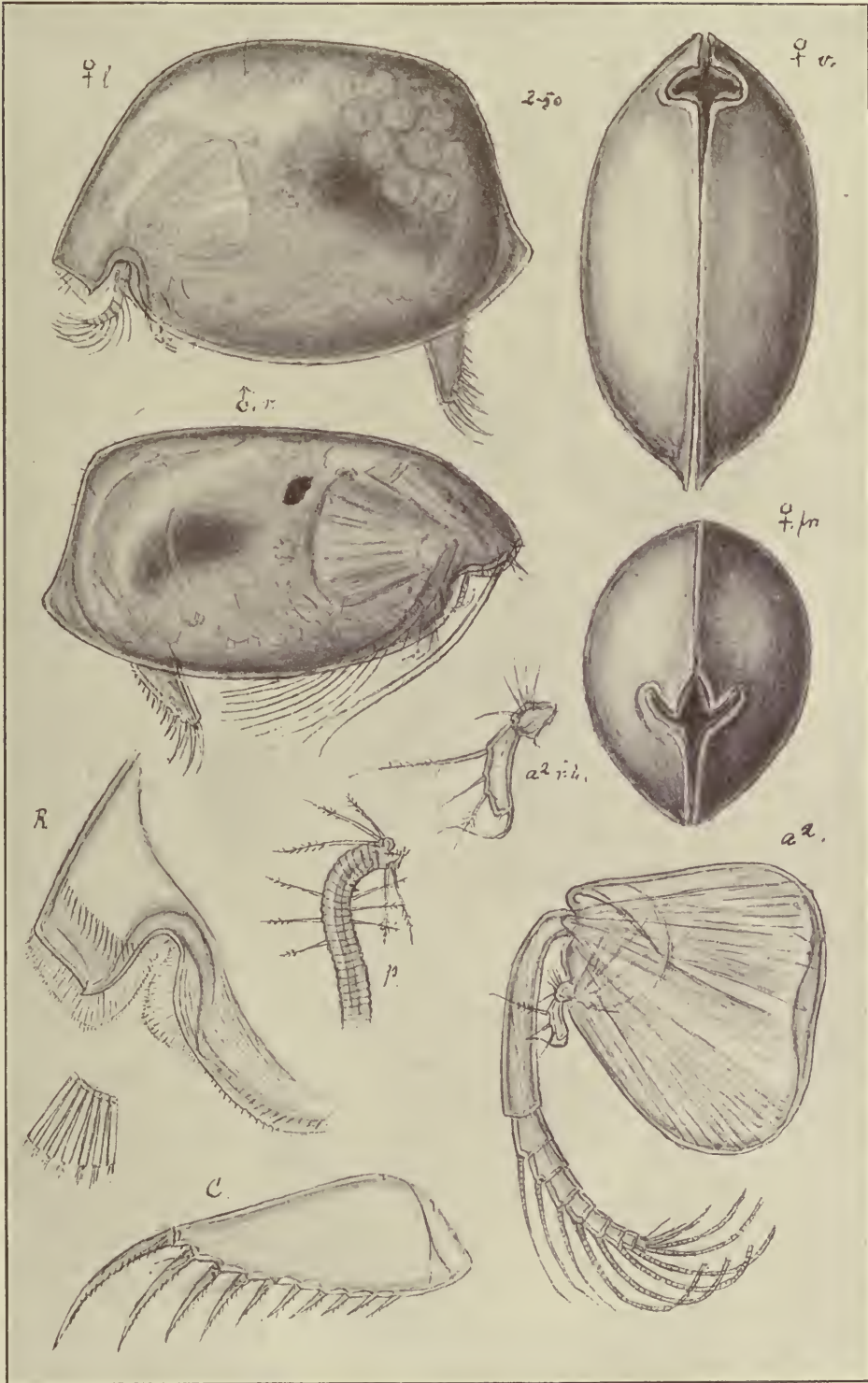


# Ostracoda

Cypridinidæ

Myodocopa

Pl. VIII



G. O. Sars del.

*Philomedes Lilljeborgi*, G. O. Sars

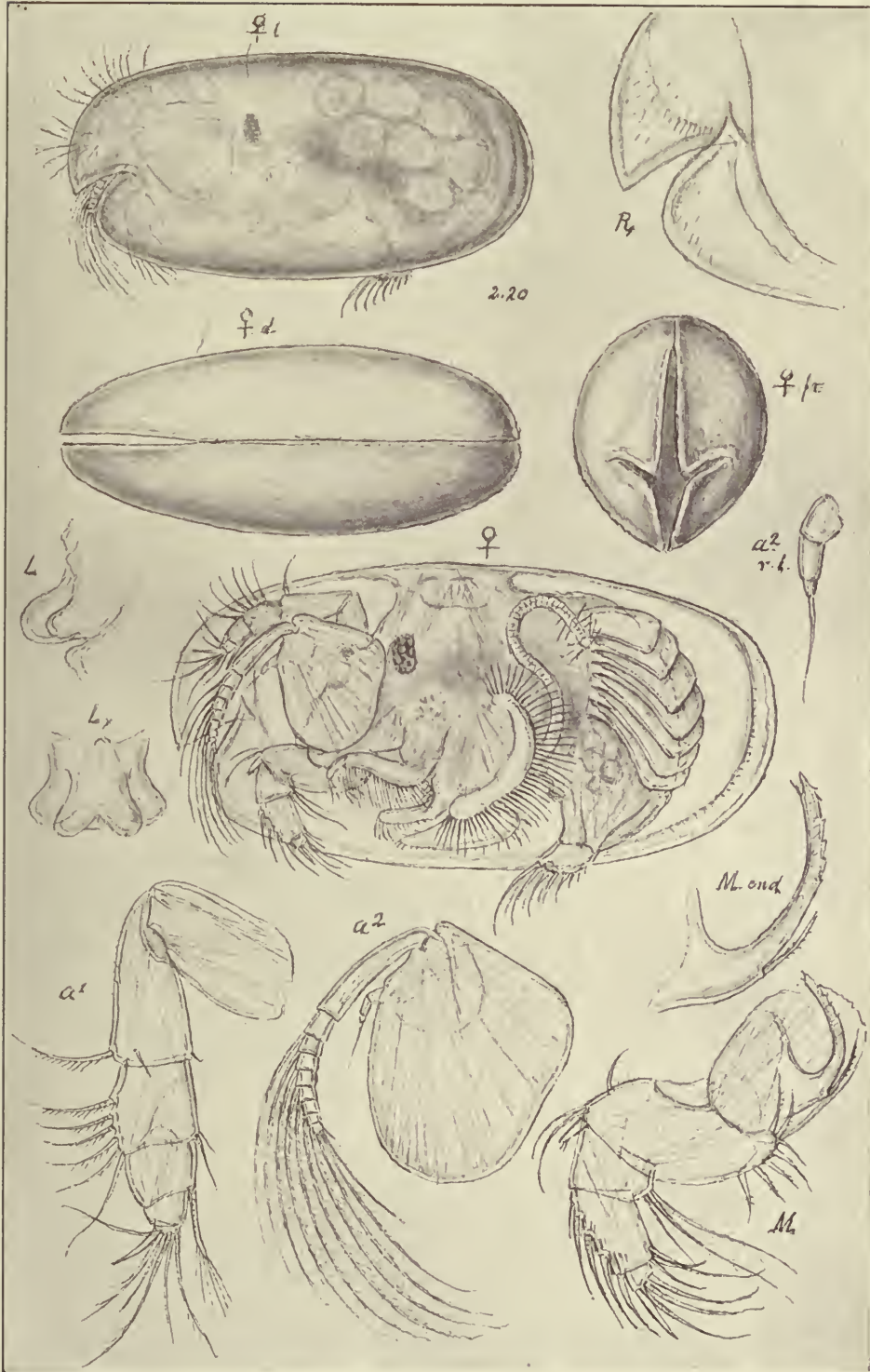


# Ostracoda

Cypridinidæ

Myodocopa

Pl. IX



G. O. Sars del.

*Asterope Mariæ*, (Baird)



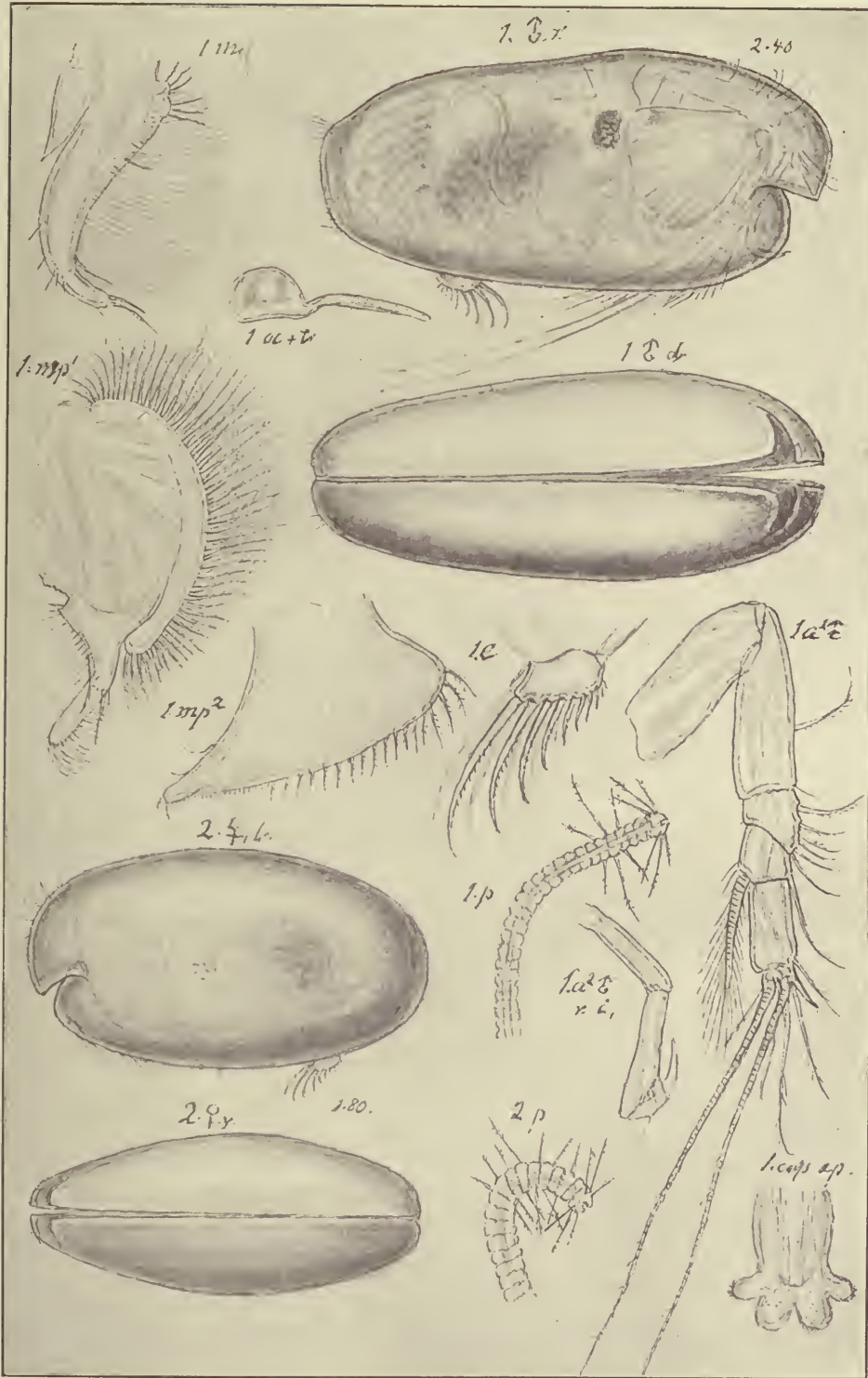


# Ostracoda

Cypridinidæ

Myodocopa

Pl. X



G. O. Sars del.

1. *Asterope Mariæ* (Baird) contin.
2. „ *abyssicola*, G. O. Sars

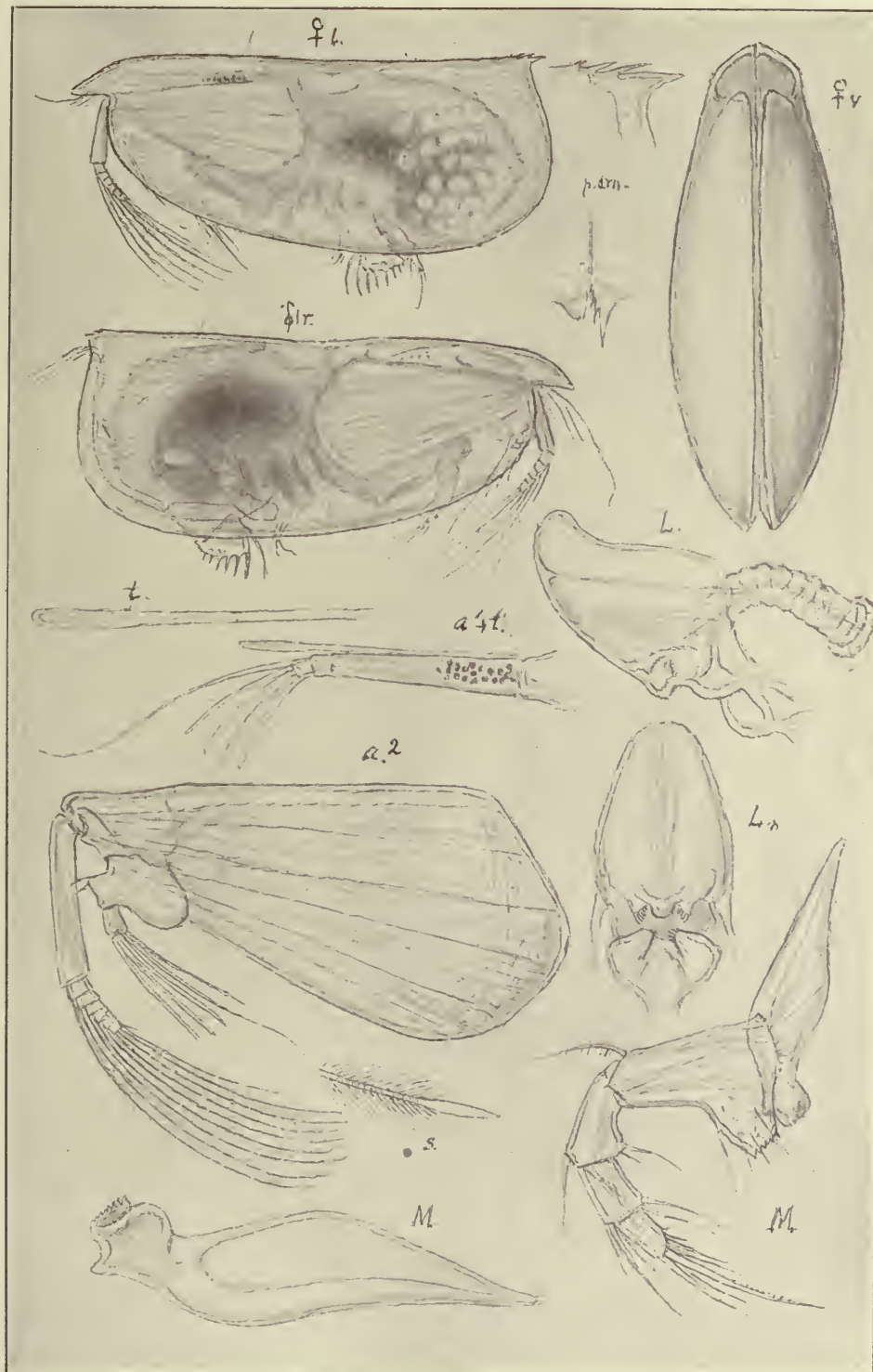


# Ostracoda

Conchoeciidae

Myodocopa

Pl. XI



G. O. Sars del.

*Conchoecia elegans*, G. O. Sars



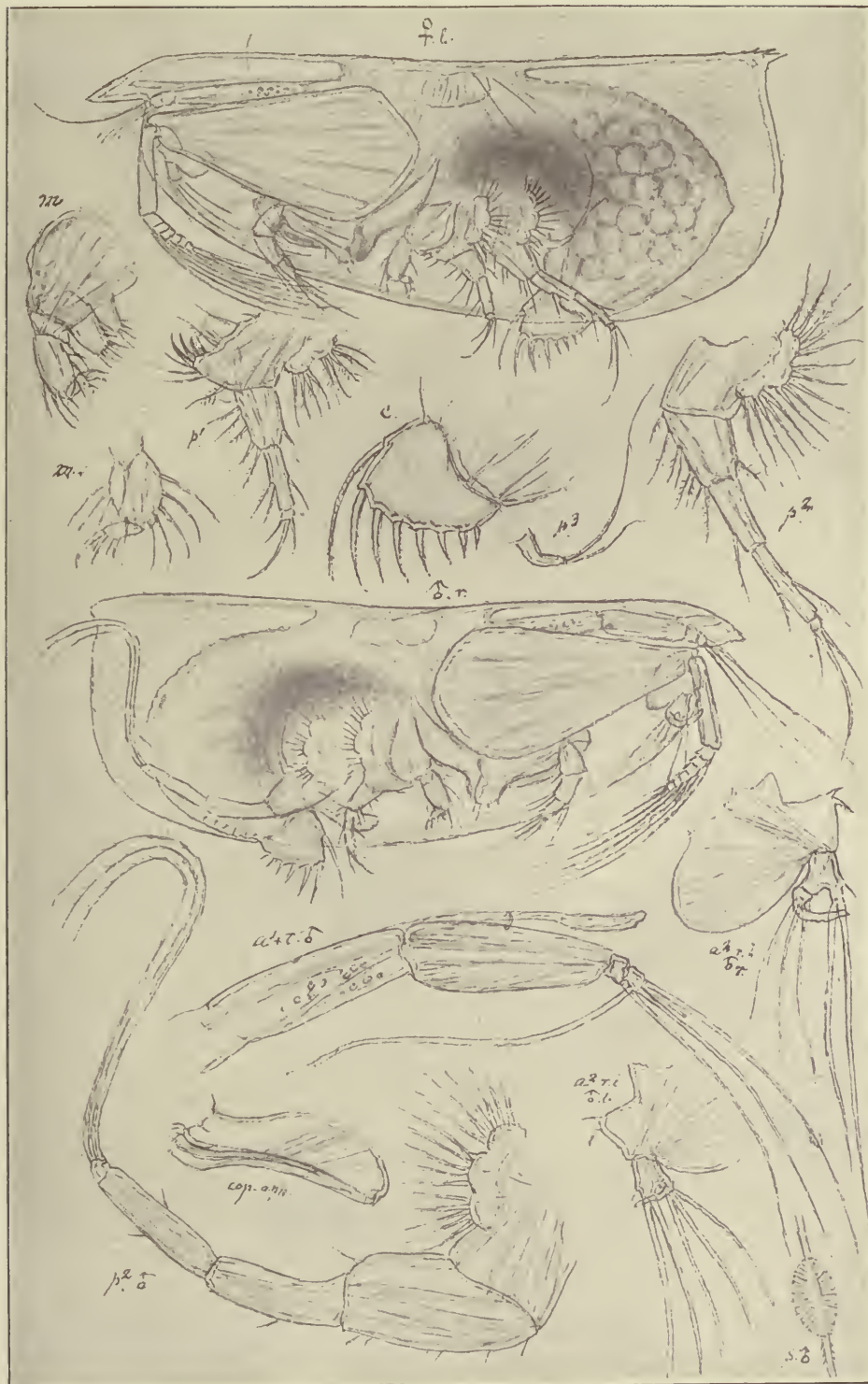


# Ostracoda

Conchoeciidae

Myodocopa

Pl. XII



G. O. Sars del.

*Conchoecia elegans*, G. O. Sars  
(continued)

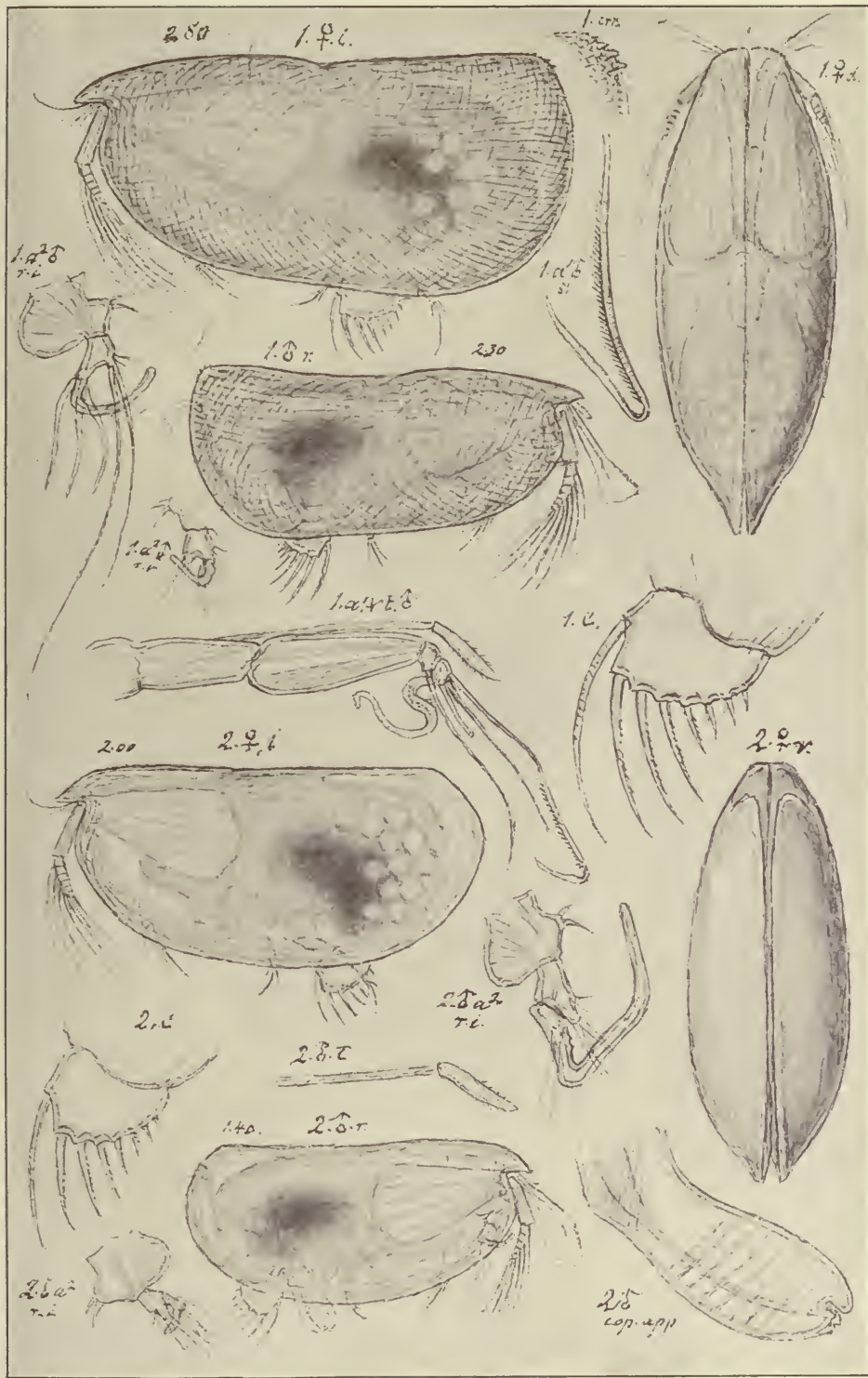


# Ostracoda

Conchoeciidae

## Myodocopa

Pl. XIII



G. O. Sars del.

1. *Conchoecia borealis*, G. O. Sars
2. „ *obtusata*, G. O. Sars





# Ostracoda

Polycopidæ

Cladocopa

Pl. XIV



G. O. Sars del.

*Polycope orbicularis*, G. O. Sars

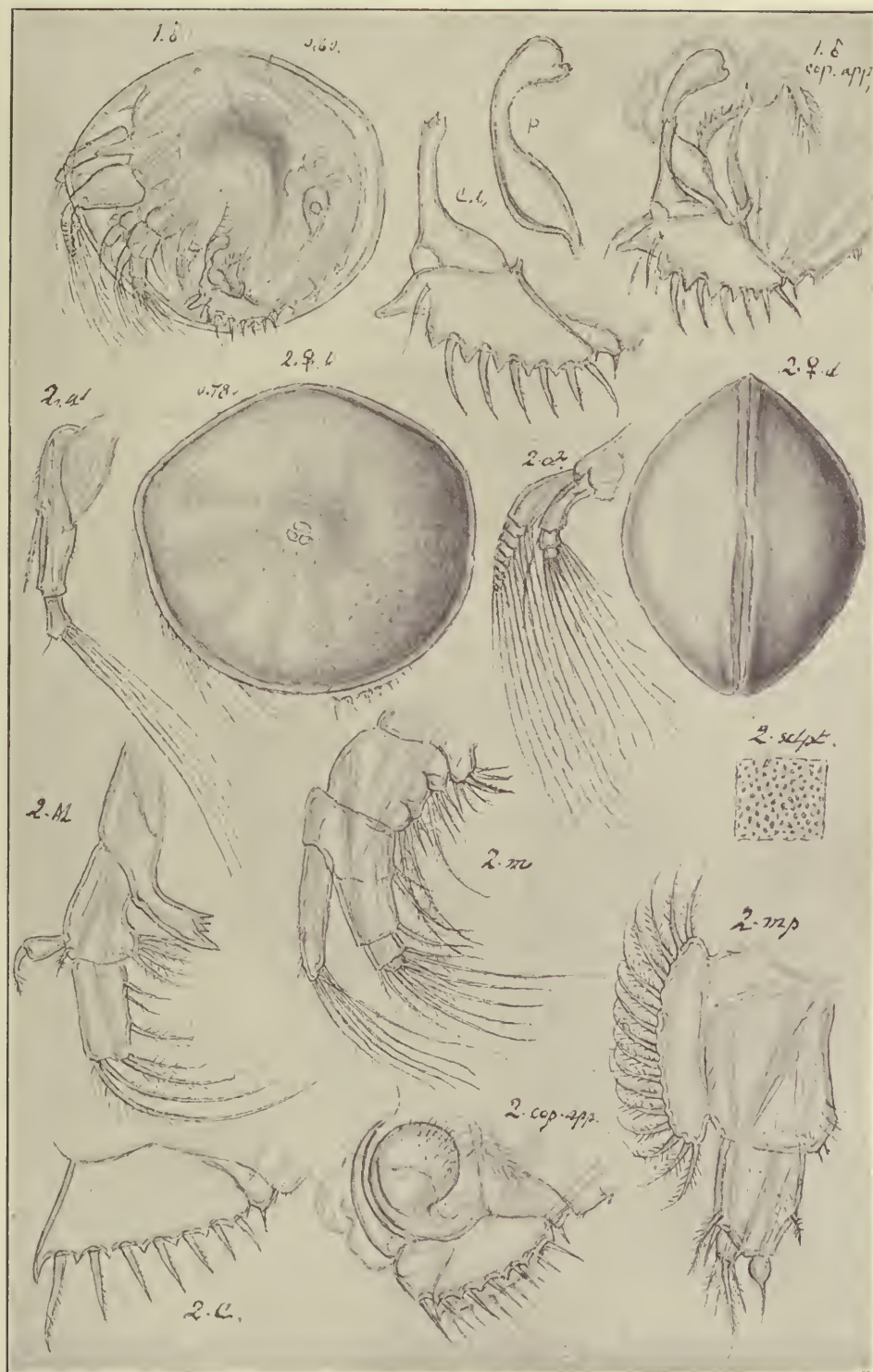


# Ostracoda

Polycopidæ

Cladocopa

Pl. XV



G. O. Sars del.

1. *Polycope orbicularis*, G. O. Sars (male)
2. „ „ *punctata*, G. O. Sars



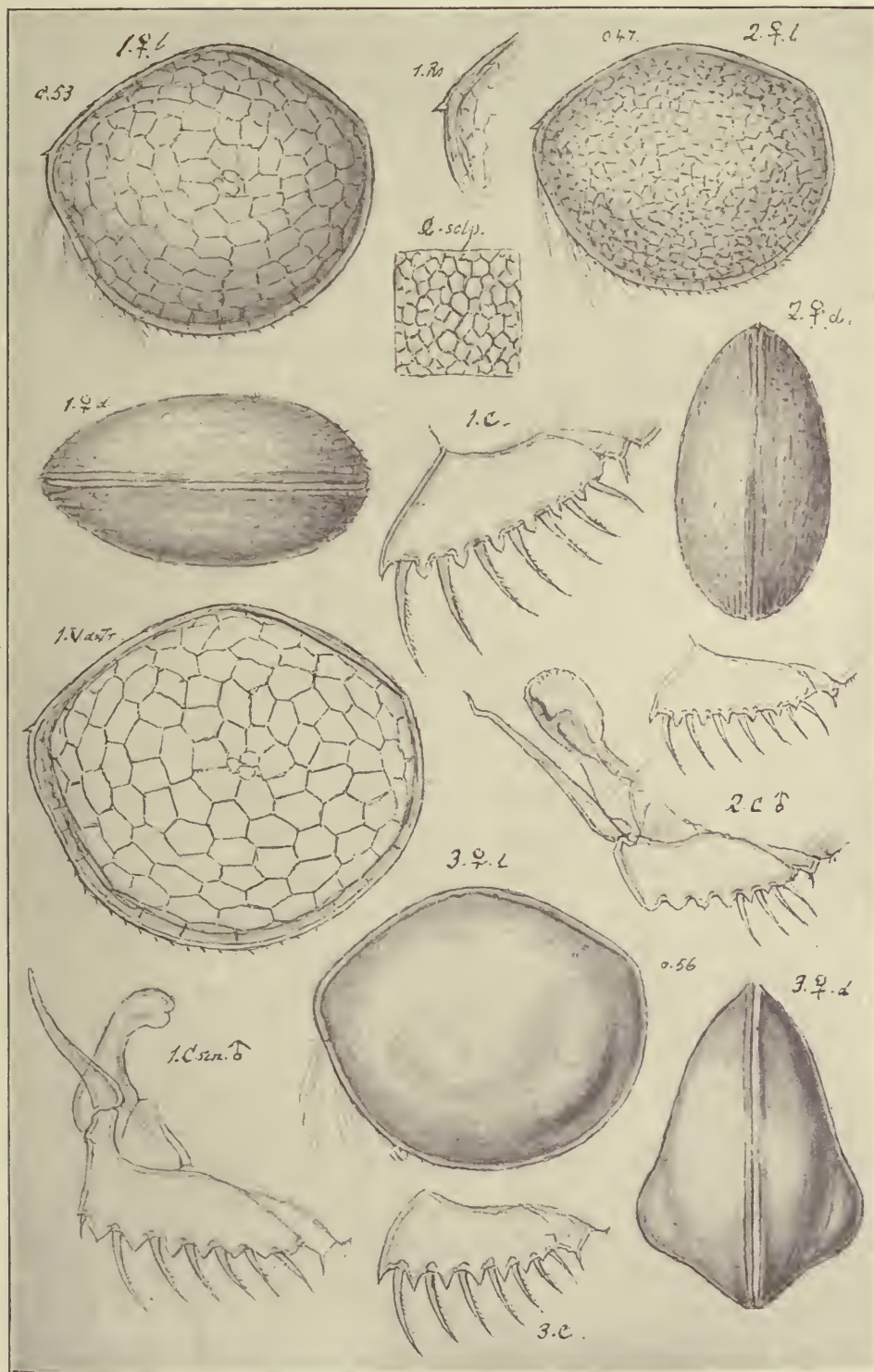


# Ostracoda

Polycopidæ

Cladocopa

Pl. XVI



G. O. Sars del.

1. Polycopella areolata, G. O. Sars
2. " clathrata, G. O. Sars
3. " pustulata, G. O. Sars



all produced, and the marginal claws comparatively thinner than in female; anterior upturned process slender, falciform, and terminating in a thin setiform point. Chief piece of the copulatory apparatus short and thick, almost globular in shape, and clothed all over with small spikes.

Colour whitish gray, variegated with a light yellowish green pigment forming irregular patches radiating, as in *P. orbicularis*, from the centre of each valve to the margins.

Length of adult female amounting to 0.78 mm.

*Remarks.*—The above-described form is nearly allied to the typical species, but of somewhat larger size, and moreover easily recognised by the closely punctate sculpture of the valves and the wholly absence of any reticulation on the same. In the fresh state it also distinguishes itself by a rather different colour.

*Occurrence.*—I have only met with this form in a single locality of the Norwegian coast, viz., off the Lofoten islands, where it occurred at the considerable depth of 120—250 fathoms.

*Distribution.*—? British Isles (Brady).

### 3. *Polycope areolata*, G. O. Sars, n. sp.

(Pl. XVI, fig. 1).

*Specific Characters.*—*Female.* Shell far less tumid than in the 2 preceding species, seen laterally, of a somewhat irregular rounded shape, with the greatest height a little behind the middle and not attaining the length, dorsal margin abruptly arched beyond the middle, ventral margin forming a more even and rather bold curve, anterior extremity conspicuously bowed in the middle, posterior bluntly truncated, with no trace of angle below;—seen dorsally, regularly oval in outline, with the lateral edges quite evenly curved, the greatest width scarcely exceeding half the length. Surface of valves conspicuously sculptured, exhibiting a very sharply marked areolation into comparatively wide polygonal meshes, ventral edges in the greater part of their length fringed with delicate spinules; right valve armed, just above the most prominent part of the frontal margin, with a well marked, though rather small dentiform process. Structure of the several limbs not exhibiting any pronounced difference from that in the type species. Caudal lamellæ somewhat resembling in shape those in *P. punctata*, but having the anterior corner far less produced, whereas the marginal processes between the claws are rather more fully developed.

*Male* having the shell somewhat less high than in female, but otherwise rather similar both in shape and sculpture. Left caudal lamella with the foremost claw very small and rudimentary, and the anterior corner not at all pro-



duced; upturned process not much elongated, simply spiniform, and sharply defined at the base. Chief piece of the copulatory apparatus of a somewhat similar shape to that in the male of *P. orbicularis*, but less elongated.

Colour not yet ascertained.

Length of adult female 0.53 mm., of male 0.48 mm.

*Remarks.*—The present species may be at once distinguished from either of the 2 preceding ones by the far less tumid shell, and more particularly by the very sharply marked areolation of the valves. Another rather conspicuous difference is found in the frontal armature of the right valve.

*Occurrence.*—Some few specimens of this form were picked up from samples collected at Korshavn, south coast of Norway, and taken at moderate depths. I have not met with this form in any other place on the Norwegian coast.

#### 4. *Polycope clathrata*, G. O. Sars, n. sp.

(Pl. XVI, fig. 2)

*Specific Characters.*—*Female.* Shell very similar in shape to that in the preceding species, but of smaller size and somewhat less high in proportion to the length. Surface of valves very coarsely sculptured, exhibiting an exceedingly dense reticulation, the meshes being much smaller and more crowded than in the preceding species, ventral edges nearly in their whole length fringed with delicate spinules; right valve armed in front with a similar dentiform process to that found in *P. areolata*, though of somewhat larger size. Caudal lamellæ not much different in shape from those in that species.

*Male* rather smaller than female, but resembling it very much both in its general appearance and in the characteristic sculpture of the valves. Left caudal lamella with the anterior corner blunted, and the 3 foremost claws (in the specimen examined) wholly absent, upturned process rather slender and almost straight, terminating in a somewhat tortuous point. Chief piece of the copulatory apparatus comparatively large and lamellarly dilated at the end.

Colour not yet ascertained.

Length of female 0.47 mm, of male 0.42 mm.

*Remarks.*—The present form is closely allied to the preceding species, but of rather smaller size, and moreover at once distinguished by the much denser reticulation of the valves. The transformed left caudal ramus of the male and the chief piece of the copulatory apparatus also exhibit well marked differences from those parts in *P. areolata*.

*Occurrence.*—Two specimens only of this form have as yet come under my notice. The male specimen was obtained from the same sample in which

the preceding species occurred; the female was found among some specimens of *P. orbicularis* collected, many years ago, of the west coast of Norway, the exact locality not being noted.

5. *Polycope pustulata*, G. O. Sars.

(Pl. XVI, fig. 3)

*Polycope pustulata*, G. O. Sars. Oversigt af Norges Crustaceer, Part II, Chr. Vid. Selsk. Forh. 1890, p. 53.

*Specific Characters.—Female.* Shell, seen laterally, of the usual short rounded shape, with the anterior extremity slightly bowed in the middle, the posterior blunted and exhibiting above trace of an angle;—seen dorsally, of a rather peculiar shape, being narrowed in front and much dilated behind, with a very conspicuous pustuliform prominence on each side. Valves smooth, without any obvious sculpture, and quite unarmed in front. Caudal rami resembling in shape those in *P. orbicularis*, the triangular processes of the margin between the claws being rather produced.

Colour about as in *P. orbicularis*.

Length of shell 0.56 mm.

*Male* unknown.

*Remarks.*—The present form may at once be distinguished from any of the other known species of the present genus by the peculiar pustuliform expansions of the hinder part of the shell, best seen in the dorsal or ventral aspect. Otherwise it seems to be closely allied to the type species.

*Occurrence.*—A solitary female specimen only of this form has as yet come under my notice. It was found, many years ago, off the west coast of Norway, the exact locality not being noted. Out of Norway this form has not yet been recorded.

6. *Polycope sublævis*, G. O. Sars, n. sp.

(Pl. XVII, fig. 1)

*Specific Characters.—Female.* Shell, seen laterally, resembling in shape that of the type species, though having the anterior extremity a little more bowed in the middle;—seen dorsally, regularly oval in outline, with the lateral contours quite evenly curved, and the greatest width only slightly exceeding half the length. Surface of valves nearly smooth, though in some cases a very faint reticulation may be discerned; anterior edges unarmed. Caudal lamellæ resembling in structure those in *P. orbicularis*, though comparatively somewhat narrower, with the anterior corner more produced and the claws shorter.

*Male*, as usual, very like the female in its general appearance. Left caudal lamella produced in front to a comparatively short and stout, almost



straight prominence clothed at the somewhat obtuse point with small spikes. Chief piece of the copulatory apparatus abruptly curved upwards, with the outer part narrow cylindric in shape and obtusely blunted at the tip.

Colour not yet ascertained.

Length of adult female 0.50 mm.

*Remarks.*—The above-described form so closely resembles young specimens of *P. orbicularis*, as easily at the first sight to be confounded with that species. On a closer examination, however, it may at once be distinguished by the far less tumid shell, its dorsal or ventral aspects being indeed very different in the 2 species (compare the figures here given). Moreover well marked differences are found in the shape of the transformed left caudal lamella in the male, as also in that of the chief piece of the copulatory apparatus.

*Occurrence.*—It is only recently that I have been aware of this species, which may be not uncommon, at least on the south coast of Norway, as I have succeeded in finding several specimens, both males and females, among material collected partly at Risør, partly at Korshavn.

## Gen. 2. **Polycopsis**, G. W. Müller, 1894.

*Generic Characters.*—Shell of a somewhat similar shape to that in *Polycope*, though more compressed, and having the anterior part of the ventral edges distinctly serrate. Anterior antennæ of a rather deviating structure, being composed of a greater number of joints than in *Polycope*, amounting to 6 in all, the first 2 of which are rather large and expanded, the 4 remaining joints abruptly much smaller; 2nd joint much the largest and divided in front into 2 remarkable deflexed lappets, the distal one triangular in shape and highly chitinised curving over the terminal part of the antenna. Posterior antennæ with the inner ramus in male distinctly prehensile, being armed at the end, in front of the setæ, with a slender recurved claw. Mandibles with the masticatory part very narrow and imperfectly dentated at the end; distal joint of the palp somewhat differing in shape from that in *Polycope*, and having one of the apical setæ much stronger than the others, almost claw-shaped. Maxillipeds with the terminal joint imperfectly defined. Caudal lamellæ with the anterior corner bidentate.

*Remarks.*—This genus was established in the year 1894 by G. W. Müller, to comprise the *Polycope compressa* of Brady & Robertson and an additional Mediterranean species, *P. serrata*. It is especially distinguished by the peculiar structure of the anterior antennæ, and exhibits also some other well-marked differences, as mentioned in the above diagnosis. Of the 2 as yet known species, the one only is represented in the Fauna of Norway.

## 7. *Polycopsis compressa* (Brady & Robertson).

(Pl. XVII, fig. 2)

*Polycope compressa*, Brady & Robertson, Ann. Mag. Nat. Hist. ser. IV, Vol. III, p. 20,  
Pl. XXI, figs. 5—11.

*Specific Characters.*—*Female.* Shell rather compressed, seen laterally, of a somewhat obliquely rounded shape, greatest height in the middle and only little inferior to the length, dorsal and ventral margins evenly curved, anterior extremity broadly rounded and only very slightly bowed in the middle, posterior narrower and quite evenly rounded at the end, without any trace of an angle above;—seen dorsally, narrow oblong in outline, with the lateral edges nearly straight in the middle, greatest width somewhat behind the middle and not nearly attaining half the length, anterior extremity more narrowed than the posterior. Surface of valves smooth, of a dull appearance, not exhibiting any obvious sculpture; anterior part of the ventral edges with about 16 well-marked serratures, smaller however than in *P. serrata*. Anterior antennæ with both lappets of the 2nd joint well defined, the proximal one however much narrower than the distal one, both tipped with a single seta; 2 other well-developed ciliated setæ, not found in *Polycope*, present, the one issuing from the upper distal corner of the 1st joint, the other on the posterior edge of the 2nd joint near its end; terminal part of the antenna distinctly 4-articulate and tipped with 5 natatory setæ. Caudal lamellæ each armed, as in *Polycope*, with 7 claws, intercurrent processes of the margin comparatively small.

Colour opaque whitish.

Length of the specimen examined 0.61 mm.

*Remarks.*—This form was at first described by Brady and Robertson as a species of the genus *Polycope*, but was subsequently by G. W. Müller justly removed as the type of a distinct genus. The latter author had also an opportunity of examining male specimens, and has stated the presence in them of a well-developed apical claw on the inner ramus of the posterior antennæ, a feature not found in the species of *Polycope*. The present form may, also without dissection, be easily recognised from any of the species of that genus described in the preceding pages, by the much more compressed shell and by the rather conspicuous serratures of the anterior part of the ventral edges.

*Occurrence.*—A solitary female specimen only of this form has as yet come under my notice. It was taken at Korshavn, south coast of Norway in comparatively shallow water.

*Distribution.*—British Isles (Brady), Mediterranean (G. W. Müller).



### Suborder 3.

## Platycopa.

*General Characters.*—Shell strongly calcareous, without any persistent aperture in front, and in general appearance not very unlike that in some of the *Podocopa*. Enclosed animal, however, built on a very different type. Both pairs of antennæ very powerfully developed and allowing to be extruded from the shell in front, being however scarcely at all natatory, the anterior ones multiarticulate and abruptly geniculate at the base, the posterior ones exhibiting a structure totally different from that in any other known Ostracoda, being broad and flattened, biramous, and in their general appearance somewhat recalling the legs of Copepoda. All the other appendages of rather weak structure and wholly concealed within the shell. 3 pairs only of postoral limbs present, none of them pediform; last pair in female quite rudimentary. Caudal rami rather feeble, and differing conspicuously both in shape and armature from those in the other known Ostracoda. No frontal tentacle present, nor any distinctly developed visual organs or heart.

*Remarks.*—This suborder also was founded by the present author in the year 1865 on a single genus, viz., *Cytherella*, the species of which at that time were only known in a fossil condition, and which of course only could be determined from the characters of the shell, the genus being considered as nearly allied to *Cythere*. By the discovery of a recent species occurring off the Norwegian coast, I had an opportunity of examining also the enclosed body, and found it to my great astonishment so totally different in structure from that in any of the other Ostracoda known to me, that I could not hesitate in establishing for the reception of this genus not only a particular family, *Cytherellidæ*, but even a distinct group of higher systematic rank, named as above in allusion to the peculiar structure of the posterior antennæ. The statements about the remarkable structural details in this genus given by me at that time, though unfortunately without any accompanying figures, have since partly been confirmed by 2 other authors, Brady and G. W. Müller, who has given figures of the limbs in 2 nearly allied recent species. The latter author,

however, did not consider the differences great enough to justify the establishment of a distinct suborder, and proposed to include the family Cytherellidæ within the suborder *Podocopa*, placing it near the family *Darwinulidæ*. I am quite unable to consent with G. W. Müller in this view, and the most recent author, Dr. Skogsberg, also rejects it decidedly, fully admitting the present suborder, though designing it with a new name, viz., *Cytherelliformes*.

## Fam. Cytherellidæ.

*Remarks.*—As this family at present only comprises a single genus, it may suffice to give the characters of that genus. I am however by no means convinced that all the fossil forms referred to it are in reality congeneric.

### Gen. *Cytherella*, Bosquet, 1852.

*Generic Characters.*—Shell of very firm consistency, highly calcareous and quite opaque, being more or less compressed and, seen laterally, of oval or elliptical shape. Valves very unequal, the right one being much the larger and overlapping the left around all the margins; muscular spots densely crowded and arranged in a double vertical row near the centre of each valve; inner duplicatures very narrow, almost obsolete. Anterior antennæ strongly built, 7-articulate, all the joints sharply defined and more or less produced in front, carrying tufts of comparatively short spiniform setæ, the first 2 joints the largest and forming together an abrupt geniculate bend. Posterior antennæ with the basal part divided into 2 sharply defined segments forming together a very movable articulation, rami however apparently firmly connected to the end of the basal part and of somewhat unequal size, the inner one the longer and 3-articulate, the outer biarticulate, both rami carrying numerous strong spiniform setæ. Anterior lip large, and somewhat bell-shaped. Mandibles rather small, with the masticatory part obliquely truncated at the end and fringed with a dense row of delicate spinules; palp sub-cylindrical in shape, almost straight, and only composed of 2 joints, the distal one small, bisetose, the proximal one provided at the base anteriorly with a small setiferous lamella and clothed along the inner face with a dense comb-like row of delicate recurved setæ. Maxillæ carrying at the base a very largely developed vibratory plate, and

exhibiting inside the basal part 3 well defined masticatory lobes; palp slender and somewhat resembling in shape and armature the mandibular palp, though without any setose lamella at the base. Penultimate pair of limbs (maxillipeds) only composed of 2 lamellar segments, the proximal one the larger and provided outside with a well developed vibratory plate, though rather smaller than that on the maxillæ, wanting however any trace of masticatory lobes, distal joint narrow oblong in shape and clothed with a few irregularly arranged setæ, some of which are densely plumose. Last pair of limbs in female each only represented by a simple rounded lamellæ carrying a few setæ on the end. This and the preceding pair in male, however, provided with a strongly developed prehensile appendage, that of the maxillipeds being of a very peculiar appearance, somewhat hatchet-shaped, that of the last pair of limbs more resembling in shape the prehensile palp of the maxillipeds usually met with in male Cypridæ. Posterior part of body in both sexes divided by transverse chitinous stripes, as it were, into numerous short segments, some of which carry dorsally long diverging setæ. Caudal rami of rather delicate structure, forming 2 thin juxtaposed lamellæ extending forwards below the body and fringed around the somewhat dilated extremity with a number of peculiar flattened spines, each terminating in a thin setiform lash. Copulatory appendages of male large, symmetrical, forming 2 slender and attenuated pieces curving upwards. Ripe ova received within the shell-cavity for farther development.

*Remarks.*—This genus was established in the year 1852 by Bosquet to include some fossil Ostracoda found in the tertiary deposits of France and Belgium. The genus was placed by him in the family *Cytheridæ*, near to *Cythere*. The true systematic relation was first settled in the year 1865 by the present author.

Several recent species have in the latter years been added to that observed by me, all of them being found in considerable depths of the oceans; but in almost every case the examination of these species has been limited to the shell. The only additional informations about the structural details have, as far as I know, been given by Brady for a species, *C. serrulata*, taken off the coast of Marocco, and by G. W. Müller for a Mediterranean species, *C. sordida*. The genus is represented in the Fauna of Norway by a single species only, to be described below.



*Cytherella abyssorum*, G. O. Sars.

(Pl. XVIII &amp; XIX)

*Cytherella abyssorum*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 127.Syn: *Cytherella Beyrichi*, Brady." — *scotica*, Brady.

*Specific Characters.*—*Female.* Shell much compressed, seen laterally, of a rather regular oval or elliptical shape, with the height somewhat exceeding half the length, dorsal margin straight, ventral very slightly sinuated, both extremities rounded off and nearly equal;—seen dorsally, very narrow, almost cuneiform in outline, with the lateral margins scarcely at all bowed, anterior extremity narrowly truncated, posterior abruptly dilated near the end and blunted behind. Left valve much smaller than the right and fringed at its free edges with a thin hyaline border, which fits closely in a groove of the right valve, when the shell is closed. Surface of shell smooth, though exhibiting a somewhat dull appearance by numerous well-marked impressed pits, and in fresh specimens clothed with scattered rigid hairs especially at the hind extremity. Anterior antennæ with the 1st joint rather massive and provided in front with a number of somewhat unequal bristles, behind with a considerably longer seta, 2nd joint abruptly bent upon the 1st ventrally and carrying in front 3 stout distinctly ciliated setæ arising close together from a slight prominence of the edge; 3rd joint comparatively simple, being quite unarmed in front and only provided at the end behind with a thin bristle; 4th joint with 2 such bristles and, like the 2nd, carrying in front 3 subequal stout setæ attached to a well-marked blunt prominence; 5th joint of a similar structure, though without any bristles behind; 6th joint with only 2 setæ in front, but provided at the end behind with a small bristle; terminal joint much narrower than the others and somewhat obliquely truncated at the end, carrying 4 unequal setæ, one of them rather small and attached to the anterior edge. Posterior antennæ with the 2 segments of the basal part forming together generally an abrupt genicular bend, 2nd segment somewhat smaller than the 1st, but slightly widening distally and exerted behind to a somewhat projecting corner tipped with 3 slender setæ, anterior edge of the segment clothed with tufts of fine hairs; outer ramus about equal in length to that segment and having the proximal joint rather large, quadrangular in shape, distal joint however very small, lamelliform; inner ramus



with its 3 joints gradually diminishing in size, the 1st being provided near the base posteriorly with a bundle of small sensory filaments; setæ of both rami very coarse and more or less recurved. Caudal lamellæ somewhat constricted in the middle, and having the outer part slightly expanded, each with 9—10 marginal spines densely crowded around the blunted extremity, the middle spines being the longest, the others gradually diminishing in length.

*Male* somewhat smaller than female and having the shell conspicuously more compressed, with the posterior extremity far less abruptly dilated. Prehensile appendage of maxillipeds with the basal part elongate subfusiform in shape, exhibiting inside 2 successive, but rather remote bisetose prominences and projecting at the end outside in a sharp corner; terminal mobile part much shorter than the basal one, but somewhat dilated at the base which is exerted in front to an angular corner followed by a number of well marked serratures of the edge. Prehensile appendage of last pair of limbs rather different in shape, forming a slender, distinctly 3-articulate stem bent in the middle in an elbow-like manner, and provided outside the 1st (basal) joint with a dense series of delicate finely ciliated setæ. Copulatory appendages somewhat thickened at the base, but terminating in a very narrow cylindrical extremity.

Colour in both sexes opaque whitish.

Length of adult female amounting to 0.95 mm., of male to 0.90 mm.

*Remarks.*—It may be that the above-described form in reality is identical with one or other of the numerous fossil species recorded; but as I find it impossible at present to decide this with certainty, I prefer to record the species under the specific name given to it in 1865 and admitted by all subsequent authors. The 2 forms named by Brady as *C. Beyrichi* and *C. scotica* are quoted here as synonyms on the authority of that author.

*Occurrence.*—Of this remarkable form at first only a few empty shells were found off the Lofoten islands in depths ranging from 100 to 300 fathoms. Subsequently, however, my late father succeeded in picking up a considerable number of specimens from dried mud taken partly from the deeps off the Lofoten islands, partly from several other places of the west coast off Norway. Some of these specimens had still their 2 valves in situ, and on a closer examination I found the enclosed body in a few of them sufficiently well preserved to allow a detailed investigation of the several limbs.

As to the habits of the animal, very little can be said, as I have not yet had an opportunity of observing it in the living state. It may however be inferred from the heavy condition of the shell and the peculiar structure of the

antennæ, that the animal is quite incapable to move freely in the water, and of course is always bound to the bottom, dragging itself slowly through the loose mud chiefly by the aid of its powerful posterior antennæ which may act as a sort of shoving-implements for throwing away the mud in its route.

*Distribution.*—British Isles (Brady), Mediterranean at Nice (Marquis de Folin), Atlantic Ocean down to 410 fathoms (Valorous Expedition).

#### Suborder 4.

### Podocopa.

*General Characters.*—Shell without any persistent aperture in front, and of very varying shape and sculpture, but always somewhat flattened below, with the ventral edges of the valves in the oral region conspicuously bent inwards and somewhat bowed, so as to overlap each other, when the shell is closed. Both pairs of antennæ well developed and partaking in the movements of the animal, being in some cases adapted for swimming, in other case only for crawling; the posterior ones very unlike those in the 3 preceding suborders, being pronouncedly pediform, geniculate in front, and clawed at the tip. Mandibles, as a rule, well developed and provided with a deflexed 4-articulate palp of moderate size and provided at the base with a movable setiferous lamella. 4 pairs of postoral limbs always present, the anterior ones (maxillæ) provided at the base with a large vibratory plate and terminating in 4 densely crowded and more or less digitiform setiferous lobes, the outermost of which represents the palp. The next pair of limbs in some cases subservient to mastication and having the palp (endopodite) imperfectly developed, thus more properly termed maxillipeds, in other cases however pronouncedly pediform, like the 2 succeeding pairs. Caudal rami, when perfectly developed, forming 2 slender and very mobile pieces armed at the tip with 2 claws only, in many cases however much reduced in size and apparently immobile. Compound eyes wanting, but in most cases an ocellus, simple or bipartite, may be found to exist. No frontal tentacle nor any trace of a heart present. Intestine divided by a mediate constriction into 2 well defined compartments, the anterior of which may be provided with 2 more or less developed lateral coeca. Genital organs of rather varying structure. Copulative appendages of male symmetrical and often very complex.

*Remarks.*—This suborder proposed by the present author in 1865, is a very natural one, exhibiting a number of well marked distinguishing characters derived both from the shell and from the enclosed body. It has also been approved by all subsequent authors, though its limits were somewhat altered



by G. W. Müller by the reception within it of the family *Cytherellidæ*. As above shown, this family cannot however by any means find its place within the present suborder. The name, as here given, alludes to the pronouncedly pediform structure of the posterior antennæ, the general appearance of which is not unlike that of the mandibular palps in the *Myodocopa*. As to the shell, the peculiar closure of the valves in the oral region is very characteristic, no trace of such a closure being found in any of the forms belonging to the 3 preceding suborders, whereas in all the known *Podocopa* its existence may easily be demonstrated.

The present suborder comprises the far greater bulk of the known Ostracoda, and is represented both in the sea and in fresh water. We may distinguish within it 2 well defined families, viz., the *Cypridæ* and the *Cytheridæ*, both established as early as the year 1852 by Baird and founded on the 2 old genera *Cypris* and *Cythere*. True, in recent times several other families have been added; but in my opinion these new families only deserve the systematic rank of subfamilies, to be classed under the head of the one or the other of the 2 above-mentioned families. In the sequel a short characteristic of these subfamilies will be given in addition to the diagnoses of the chief families.

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## Fam. 1. *Cypridæ*.

*Characters of the family.*—Shell in most cases thin, corneous, only seldom of a more solid consistency, surface smooth, never roughly sculptured, hing simple, without any closing teeth. Ocellus, when present, generally simple, not divided. Anterior antennæ scarcely at all geniculate, basal part more or less dilated and divided into 2 or 3 segments, terminal part attenuated, 4- or 5-articulate, and clothed with numerous more or less slender setæ forming together a dense apical brush. Posterior antennæ originating by a short and somewhat imperfectly defined root-joint followed by a much larger joint, which constitutes the main part of the basal portion, the latter provided at the end outside with a small scale-like appendage carrying a slender anteriorly curved seta accompanied by one or two very small bristles; terminal part abruptly curved downwards and composed of 3 or 4 somewhat unequal joints, the 1st of which is generally the largest and provided behind with a more or less developed sensory appendage, at the end inside with 4 or 5 densely



crowded setæ, which may attain a considerable length, rendering those limbs well adapted for assisting the anterior antennæ in the swimming motion of the animal, these setæ being however in some instances much reduced in size or even wholly wanting; apical claws more or less slender, and generally 4 or 5 in number. Maxillipeds with the basal part produced in front to a well defined masticatory lobe armed on the tip with curved spines or setæ, and in most cases carrying behind a more or less developed vibratory plate; palp, as a rule, in female of inconsiderable size and in male transformed to a grasping organ. Legs more or less dissimilar, the posterior one being as a rule, not ambulatory, but upturned within the cavity of the shell. Caudal rami in some cases much reduced, but in the great majority of the forms well developed and very mobile. Germinal part of the genital organs in both sexes generally lodged between the lamellæ of the valves. A pair of more or less complicated ejaculatory tubes added to the genital apparatus in male.

*Remarks.*—In the sense in which the family is here taken, it comprises a considerable number of genera, both marine and freshwater, the former deviating more or less conspicuously from the usual type prevailing in the freshwater genera, though retaining most of the characteristic features distinguishing the present family from the *Cytheridæ*. Yet a grouping of the genera within subfamilies would seem to be fully justified. 5 such subfamilies will be treated of in the sequel.

### Subfam. 1. Pontocyprinæ.

*Characters of the subfamily.*—Shell of somewhat varying shape, with the valves nearly equal and more or less hairy. Antennæ in some cases rather slender and distinctly natatory, in other cases very short and stout and scarcely adapted for swimming; the posterior ones 6-articulate; with the sensory appendage of 3rd joint very fully developed. Mandibles with the bristle attached outside the masticatory part remarkably strong and distinctly pectinate; cutting teeth simple, claw-like; palp comparatively large. Maxillæ with the masticatory lobes short and stout; palp however rather prominent and bowed in front. Maxillipeds without any trace of a vibratory plate at the base; palp in female distinctly 3-articulate, sub-pediform, in male transformed in the usual manner. Anterior

legs of normal appearance, 5-articulate, and tipped with one or 2 slender claws. Posterior legs rather unlike the anterior, though composed of the same number of joints, last joint very small, and provided with 3 more or less unequal setæ, one of which is generally pectinated; none of the setæ recurved. Caudal rami well developed, but of somewhat different shape in the several genera; in all of them, however, a very conspicuous triangular unpair prominence occurs just behind their base, tipped with a thickish densely hairy seta. Ovaria and testicles extending between the lamellæ of the valves behind. Ejaculatory tubes comparatively simple, wholly wanting the whorls of radiating spikes found in other Cyprids; eferent ducts not convoluted.

*Remarks.*—The most characteristic feature of the present subfamily is perhaps the comparatively simple structure of the ejaculatory tubes in the male. Another character, which this subfamily shares with the next one, the *Macrocyprinæ*, may also here be named, viz., the sub-pediform structure of the palps of the maxillipeds in the female. An attempt to a similar structure is however also found in one of the genera belonging to the typical Cypridæ, viz., *Ilyocypris*. Nor can the want of vibratory plates on these limbs be regarded as a decisive character, as these plates in some of the typical Cypridæ (Cypridopsis, Potamocypris) are found to be nearly quite obsolete. In all other respects the Cyprid type is pretty well manifested, and the present group cannot therefore be considered to be so decidedly different from the other Cypridæ as suggested by G. W. Müller.

3 genera referable to this subfamily will be treated of in the succeeding pages, and a 4th genus, *Pontocypris*, has also been added by G. W. Müller.

### Gen. 1. **Pontocypris**, G. O. Sars, 1865.

*Generic Characters.*—Shell comparatively thin and pellucid, of a more or less trigonal shape, with the valves unarmed on the edges, but rather densely hairy. Eye well developed. Both pairs of antennæ slender and distinctly natatory; the anterior ones with the first 2 segments of the basal part imperfectly defined, terminal part distinctly 5-articulate and clothed with rather long setæ. Posterior antennæ with the first 2 joints of the terminal part long and narrow, penultimate joint, on the other hand, quite short and, as usual, produced at the end anteriorly to a claw-bearing prominence, last joint so very minute, as easily to escape attention, though armed in the usual manner; sensory appendage of 1st joint comparatively large, club-shaped, its extremity being bladder-like dilated; natatory setæ of same joint well developed; apical

claws long and slender, 4 in number, the foremost one being somewhat shorter than the others. Mandibular palp with the branchial appendage well defined, though not of very large size. Palps of maxillipeds in female rather slender, with the middle joint narrow linear, last joint small and tipped with a slender claw-like spine accompanied by 2 small bristles; those in male of moderate size and nearly equal. Anterior legs with a single slender claw on the tip. Posterior legs with the penultimate joint very movably articulated to the preceding joint, both distinctly serrate on the outer edge, last joint very small, with the apical setæ rather unequal, one of them being much more slender than the others and exceeding considerably in length the pectinate seta. Caudal rami well developed and somewhat exerted at the end, dorsal edge of each ramus provided with 3 slender setæ, 2 of them placed close together in about the middle, the 3rd in close approximation to the apical claws. Ovarial tubes forming in the posterior part of the valves a sigmoid curve. Spermatic vessels extending more or less forwards along the ventral side of the valves, in some cases (according to G. W. Müller) forming a dense spiral coil in their anterior part.

*Remarks.*—This genus was established in the year 1865 by the present author, to include 3 species found off the Norwegian coast. 2 of these species have however subsequently been removed by G. W. Müller and placed within a new nearly-allied genus, *Erythrocypris*, the species recorded by me as *P. trigonella* being considered by him as the type of the present genus. No less than 12 Mediterranean species referable to this genus have been recorded by G. W. Müller, all of them closely related to the northern form described below.

### 1. *Pontocypris trigonella*, G. O. Sars.

(Pl. XX).

*Pontocypris trigonella*, G. O. Sars, Oversigt av Norges marine Ostracoder, p. 16.

*Specific Characters.*—*Female.* Shell, seen laterally, pronouncedly trigonal in shape and somewhat narrowed behind, greatest height a little in front of the middle and nearly attaining half the length, dorsal margin gibbously arched in front of the middle and sloping rather steeply behind, ventral margin scarcely at all sinuated, anterior extremity evenly rounded, posterior gradually tapered and obtuse at the tip;—seen dorsally, oblong oval in outline, with the greatest width in front of the middle and about equal to  $\frac{2}{5}$  of the length. Surface of shell smooth and polished and rather densely covered with fine, mostly recurved



hairs. Eye comparatively large and very conspicuous in fresh specimens. Caudal rami slightly tapered distally, and exerted at the end, in front of the apical claws, to a digitiform process carrying a short deflexed bristle, distal seta of the dorsal edge rather coarse, fully attaining the length of the apical claws, the latter subequal in size.

*Male* of somewhat smaller size than female, and slightly differing in the shape of the shell, which appears comparatively shorter and stouter. Prehensile palps of maxillipeds with the propodus oblong oval in form and provided near the end inside with a short spine accompanied by 2 unequal bristles, dactylus much curved and somewhat narrower on the left than on the right palp. Copulatory appendages of moderate size, oblong oval in shape and blunted at the end, without any, lateral lappets, but giving origin on the inner face to a freely projecting highly chitinated apparently tubular string, abruptly bent near the base and somewhat surpassing the terminal edge of the appendage.

Colour whitish, with a rather conspicuous dark brownish pigmentary patch extending along each valve below its centre, and generally also with some patches of the same colour at each extremity.

Length of adult female 0.70 mm, of male 0.62 mm.

*Remarks.*—It is very probable that one or other of the Mediterranean species recorded by G. W. Müller may prove to be identical with the present form; but as these species have chiefly been characterised only by some slight differences in the form and extension of the spermatic vessels of the male, and these differences cannot be asserted except in quite fresh and still living specimens, I am at present unable to decide the identity with full certainty. In the shape of the shell the form named *P. mediterranea* seems to come nearest to the present species and may perhaps in fact be identical with it.

*Occurrence.*—I have met with this little beautiful Ostracod in several places, both on the south and west coasts of Norway, and northwards up to the Lofoten islands. It is found in moderate depths on a muddy bottom, but nowhere in any considerable number. The animal is a very habile swimmer, moving about through the water rather speedily in the manner of the typical Cypridæ, though scarcely leaving the bottom for any longer distance. Male specimens are very rarely met with. I have hitherto only come across 2 such specimens, the one of which is figured on the accompanying plate.

*Distribution.*—British Isles (Brady), Mediterranean (Norman), Cape Verde Islands (Brady).

*Fossil* in postglacial beds of Scotland.



Gen. 2. **Erythrocypris**, G. W. Müller, 1894.Syn: *Pontocypris*, G. O. Sars (part).

*Generic Characters*.—Shell of a more or less deep reddish or brownish colour and rather more elongate than the in preceding genus, almost cuneiform in shape, with the posterior extremity considerably exerted and terminating in an obtuse point. Valves only slightly pellucid and more or less densely hairy, the right one distinctly serrated at the hind corner below. Eye wholly wanting. Both pairs of antennæ comparatively shorter and stouter than in *Pontocypris*, but otherwise of a very similar structure. The other limbs likewise built on the very same type as in that genus. Prehensile palps of the maxillipeds in male, however, considerably more powerfully developed and conspicuously unequal. Posterior legs in both sexes with the pectinate apical seta much larger than the other 2, which are very thin and subequal. Caudal rami rather stronger than in *Pontocypris* and of more equal width throughout, distal seta of the dorsal edge very small. Copulatory appendages in male of rather varying shape in the several species. Spermatic vessels densely coiled within the posterior extremity of the valves. Ovarial tubes forming a simple bend, their extremity extending forwards along the ventral edge.

*Remarks*.—This genus, established by G. W. Müller in 1894, is closely related to *Pontocypris*, and indeed 2 of its species were formerly referred by the present author to that genus. Yet, on a closer comparison, some well marked differences, mentioned in the above diagnosis, between the 2 genera are found, which would seem to corroborate the distinction of them. G. W. Müller records 7 species of this genus found by him in the gulf of Naples, one of them being however identical with the form described below as *E. mytiloides*. 2 other species belonging to the Fauna of Norway will also be treated of in the sequel.

2. **Erythrocypris mytiloides**, (Norman).

(Pl. XXI &amp; XXII)

*Cythere mytiloides* Norman, Species of Ostracoda new to Britain. Ann. Mag. Nat. Hist. Vol. IX, p. 50, Pl. III, figs. 1—3.

Syn: *Cypris serrulata*, G. O. Sars." *Cythere avena*, Norman." *Pontocypris serrulata* G. O. Sars." *Erythrocypris serrata* G. W. Müller.

*Specific Characters*.—*Female*. Shell much compressed, seen laterally, elongate triangular or somewhat cuneiform in shape, highest in front and gradually tapered behind, greatest height in the anterior third part and not nearly attaining

half the length, dorsal margin gibbously produced anteriorly and sloping rather steeply both in front and behind, ventral margin almost straight, anterior extremity rounded off, posterior tapering to an obtuse point;—seen dorsally, narrow lanceolate in outline, with the greatest width not nearly attaining  $\frac{1}{3}$  of the length and occurring in front of the middle, both extremities pointed. Valves very little pellucid and all over clothed with comparatively short hairs, right valve armed at the posterior extremity below with 8 well marked and somewhat recurved denticles. Caudal rami comparatively large and only slightly attenuated distally, apical claws somewhat unequal, the proximal one being conspicuously stronger than the distal one, which is rather thin and also a little shorter.

*Male* of about same size as female and scarcely differing in the shape of the shell. Prehensile palps of maxillipeds very powerfully developed and conspicuously dissimilar, dactylus of the right palp remarkably short and broad, subtriangular in form, that of left palp much thinner, falciform attenuated and terminating in a fine point; propodus in both palps considerably dilated and provided at the end inside with a peculiar thumb-like process of somewhat different shape in the 2 palps. Caudal rami with a very conspicuous bulge of the upper (ventral) edge in the middle not found in female. Copulative appendages of large size and peculiar shape, exhibiting in the middle a prominent lanceolate lappet and having the extremity triangularly produced or somewhat helmet-shaped.

Colour in both sexes bright purplish brown.

Length of adult female amounting to about 1 mm.

*Remarks.*—This form was shortly characterised by the present author as early as in the year 1863 under the name of *Cypris serrulata*, and was subsequently (1865) referred by him to his genus *Pontocypris*. As pointed out by Brady, this form had however been recorded at a still earlier date (1862) by Norman under the name *Cythere mytiloides*, and though this name was afterwards withdrawn by that author, on account of it having been preoccupied for another species of the same genus, I think that Brady was quite right in restoring the specific name originally proposed by Norman, since the present form has turned out to be not a *Cythere* at all. The Mediterranean form recorded by G. W. Müller as *Erythrocypris serrata* is unquestionably the same species, as clearly seen from the figures given by that author. It may be regarded as the type of the present genus.

*Occurrence.*—At first only some few specimens of this form were observed, taken partly at Christiansund, partly at Flekkefjord. More recently I have met

with it rather frequently in 2 other localities, viz., at Korshavn and Risør. Especially in the first-named locality it occurred very abundantly on a sandy bottom in the laminarian region. The animal is not nearly so agile as the species of the preceding genus, though by no means devoid of swimming power. The swimming movement is however rather slow, and look merely as a soft gliding through the water generally close over the bottom. The bright purplish colour of the shell renders this Ostracod easily discernible, and is even partly retained in specimens preserved for a longer time in alcohol.

*Distribution*.—British Isles (Brady), coast of France (Fischer), Mediterranean (G. W. Müller). *Fossil* in the postglacial deposits of Norway and Scotland.

### 3. *Erythrocypris hispida*, G. O. Sars.

(Pl. XXIII, fig. 1)

*Pontocypris hispida*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 16.

*Specific Characters*.—*Female*. Shell rather more tumid than in the preceding species; but, seen laterally, of a much similar elongate triangular shape, though scarcely so much exerted behind;—seen dorsally, broadly lanceolate in outline, with the greatest width in the anterior part, and considerably exceeding  $\frac{1}{3}$  of the length. Surface of shell densely covered with unusually long recurved hairs, giving it a very hirsute appearance; right valve with only 5 serratures below the posterior extremity. Structure of the several limbs very like that in the preceding species. Caudal rami, however, comparatively less strong and scarcely at all attenuated distally; apical claws less unequal and rather thin.

*Male* with the palps of the maxillipeds transformed in an analogous manner to those in the type species, though scarcely as large, and having the thumb-like process of the propodus far less prominent. Copulative appendages rather unlike those in the preceding species, being of much smaller size and more simple structure, without any lateral lappet, and with the extremity simply rounded off; chitinous string of the inner face curved almost in a circle. Caudal rami exactly as in female.

Colour yellowish brown.

Length of adult female scarcely exceeding 0.80 mm.

*Remarks*.—The above-described form is nearly allied to the preceding one, but may at once be distinguished by the less compressed shape of the shell and by its very coarse clothing of hairs, the latter character having given rise to the specific name proposed. In the living state it is also readily distinguished by the different colour of the shell.



*Occurrence*.—I have met with this form not unfrequently in the upper part of the Christiania Fjord in depths ranging from 10 to 20 fathoms, muddy bottom. It also occurs occasionally at Risør, south coast of Norway in about the same depth.

*Distribution*.—British Isles (Brady).

#### 4. *Erythrocypris pallida*, G. W. Müller.

(Pl. XXIII, fig. 2)

*Erythrocypris pallida*, G. W. Müller, Die Ostracoden des Golfes von Neapel, p. 259, Pl. 11, figs. 12, 13, 43—45.

*Specific Characters*.—*Female*. Shell of a very similar shape to that in the preceding species, but of rather smaller size, and with the surface far less hirsute, the hairs clothing it being rather short and delicate. Right valve, as in *E. hispida*, with only 5 serratures below the posterior extremity. Caudal rami comparatively more slender than in that species, with the extremity somewhat produced in front of the apical claws, the latter moderately strong, but scarcely exceeding half the length of the corresponding ramus.

*Male* with the palps of the maxillipeds of a similar structure to that in *E. hispida*. Copulative appendages, however, somewhat differing in shape, their outer part being conspicuously more expanded and forming inside a well marked obtuse angle.

Colour much paler than in either of the 2 preceding species.

Length of adult female scarcely exceeding 0.70 mm.

*Remarks*.—The above-described form is unquestionably identical with the Mediterranean species recorded by G. W. Müller, agreeing, as it does, pretty well with the description and figures given by that author. Though closely allied to the 2 preceding species, it may be readily distinguished by its smaller size and much paler colour, the latter character having given rise to the specific name proposed by G. W. Müller.

*Occurrence*.—I have taken this form not unfrequently at Korshavn in the same places where *E. mytiloides* occurred, occasionally also at Risør.

*Distribution*.—Mediterranean (G. W. Müller).

#### Gen. 3. *Argilloecia*, G. O. Sars, 1865.

*Generic Characters*.—Shell more or less elongate, and of firmer consistency than in the 2 preceding genera, though scarcely calcareous, surface smooth and almost bare of hairs. Valves subequal, each provided at the post-



erior extremity with a single excessively prolonged hair, and along the frontal edge with a dense fringe of peculiarly transformed and very delicate capillary appendages. Eye wholly wanting. Both pairs of antennæ short and stout, not adapted for swimming (at least in female), the anterior ones with the basal part very massive and sharply defined from the terminal part, the posterior ones with the sensory appendage peculiarly transformed, pedicellate; some of the setæ on both pairs of antennæ in male excessively prolonged and recurved. The other limbs on the whole built on the same type as in the 2 preceding genera, except that the branchial appendage of the mandibular palps is imperfectly developed, and that the anterior legs are armed on the tip with 2 subequal claws. Caudal rami comparatively small, conically tapered, with the apical claws short and much curved.

*Remarks.*—This is a very distinct genus, differing in some respects conspicuously from the 2 preceding ones, though evidently referable to the same subfamily. The genus was originally only founded on a single species described by the present author in 1865; but in recent times several other species, more or less agreeing with the typical one, have been added. Thus no less than 5 species, referable to this genus, have been recorded by G. W. Müller from the gulf of Naples, and I have myself had an opportunity of examining a 2nd Norwegian species very distinct from that at first described.

### 5. *Argilloecia cylindrica*, G. O. Sars.

(Pl. XXIV)

*Argilloecia cylindrica*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 18.

*Specific Characters.*—*Female.* Shell very narrow, almost cylindrical in shape, with the greatest height not nearly attaining half the length; seen laterally, elongate oval or somewhat elliptical in outline, and scarcely broader in front than behind, dorsal margin very little arched, ventral slightly sinuated in the middle, anterior extremity rounded off, posterior abruptly blunted;—seen dorsally, narrow oblong, with the side-edges almost straight in the middle, and the greatest width about equal to  $\frac{2}{5}$  of the length, both extremities obtusely pointed. Valves only little pellucid, with the surface smooth and polished; inner duplicatures not very broad and of quite normal appearance. Anterior antennæ with the terminal part about the length of the basal one and distinctly 5-articulate. Posterior antennæ with the outer part of the sensory appendage disciform and sharply defined from the narrow attaching stalk; natatory setæ very small and rudimentary, though present in the usual number. Branchial

appendage of the mandibular palps replaced by a single strong seta. Palps of maxillipeds short and stout, with the 2 outer joints very small. Posterior legs with 3 apical setæ, one of them very coarse, almost spiniform, and evenly curved. Caudal rami rather broad at the base, but rapidly tapering to an obtuse point carrying the very short, hamiform curved apical claws, and apparently wanting the usual small bristle in front of the claws,

*Male* much smaller than female, and having the shell still narrower, with the posterior extremity more exerted. 4 of the setæ attached to the anterior antennæ in the middle of the terminal part much produced and generally recurved along the back of the shell. Natatory setæ of the posterior antennæ prolonged in a similar manner. Palps of maxillipeds rather powerfully developed, with the propodus considerably dilated at the base and the dactylus short and stout, unguiform. Copulative appendages narrow oblong in form and obtusely rounded at the tip.

Colour in both sexes a pure white.

Length of adult female amounting to 0.69 mm., that of male scarcely exceeding 0.60 mm.

*Remarks.*—This form, being that at first described, ought of course to be regarded as the type of the present genus. It may be easily recognised from any of the other species by the almost cylindrical shape of the shell in the female, this character having indeed given rise to the specific name proposed. Of the 5 Mediterranean species recorded by G. W. Müller, *A. caudata* seems, in the shape of the shell, to come nearest to the present species.

*Occurrence.*—I have met with this Ostracod occasionally in several places on the Norwegian coast, from the Christiania Fjord to Trondhjem, and Norman also records it from Finmark (Hammerfest). It is generally found in moderate depths ranging from 10 to 30 fathoms, on a muddy bottom, and, in spite of its small size, may be easily detected by the pure white colour of the shell and by a peculiarity which it has in common with some other Ostracoda, viz., that, on coming in contact with the air, it remains floating on the surface of the water. The females are quite devoid of swimming power, crawling slowly on the bottom, like the Cytheridæ. The males, however, may perhaps lead a more free existence, as could be inferred from the peculiar prolongation of some of the setæ attached to the antennæ.

*Distribution.*—British Isles (Brady).

*Fossil* in the postglacial beds of Scotland,

6. *Argilloecia conoidea*, G. O. Sars, n. sp.  
(Pl. XXV)

*Specific Characters.*—*Female.* Shell, seen laterally, very narrow, oblong conoid in shape, greatest height in the middle and scarcely exceeding  $\frac{2}{5}$  of the length, dorsal margin gently arched and sloping with a quite even curve to the hind produced corner, ventral margin distinctly sinuated in the middle, anterior extremity broadly rounded, posterior conically tapering to an obtuse point lying below the longitudinal axis;—seen dorsally, oblong ovate in outline, with the greatest width behind the middle and only little exceeding  $\frac{1}{3}$  of the length, anterior extremity more pointed than the posterior. Valves rather pellucid, with the surface smooth and glabrous; inner duplicatures remarkably broad and exhibiting a somewhat irregular highly chitinised marginal zone, which in front projects in 2 opposit sharp corners, between which the inner edge of the duplicature is suspended. Structure of the several limbs very like that in the typical species. Posterior legs, however, only provided at the tip with 2 setæ of unequal length, the shorter one distinctly pectinate. Caudal rami comparatively narrower than in the preceding species and somewhat curved.

*Male* resembling in general appearance that of the type species, but of considerably smaller size, and having the shell comparatively still narrower, with the posterior extremity more produced. Some of the setæ attached to the 2 pairs of antennæ, as in that species excessively prolonged and recurved in the very same manner. Prehensile palps of maxillipeds with the propodus almost quadrate in form and armed at the end inside with a short spine accompanied by 2 small bristles, dactylus of moderate size and slightly curved. Copulative appendages rather slender and somewhat irregularly expanded at the end.

Colour not yet ascertained.

Length of adult female 0.59 mm, of male 0.50 mm.

*Remarks.*—Though agreeing pretty well in the essential structural details, the present species may readily be distinguished from the preceding one by the rather different shape of the shell, especially in the female. It is also of rather inferior size. In its general appearance it looks rather like some of the Mediterranean species recorded by G. W. Müller; but I have been unable to ascertain its identity with any of them.

*Occurrence.*—3 specimens only of this form, an adult female and 2 males, have as yet come under my notice. They were picked up from a gathering taken at Risør, south coast of Norway, from moderate deeps.



## Subfam. 2. Macrocyprinæ.


*Characters of the subfamily.*—Shell more or less elongate, tapered behind, and of rather firm consistency, apparently calcareous, with the surface smooth and almost bare of hairs. Valves pronouncedly unequal, the right one overlapping the left in the middle of the dorsal face; their closure in the oral region very thorough, the edges being conspicuously expanded in that place. Antennæ not adapted for swimming; the anterior ones with the 3 segments of the basal part very distinctly defined, terminal part less sharply marked off from the basal one, and having the setæ comparatively short. Posterior antennæ, as in the *Pontocyprinæ*, distinctly 6-articulate and armed at the tip with the usual number of claws, sensory appendage of 3rd joint replaced by a bundle of delicate filaments; natatory setæ wholly absent. Mandibles and maxillæ on the whole normally developed. Maxillipeds without any vibratory plate, masticatory lobe narrowly produced and sharply defined from the basal part, palp in female sub-pediform, in male transformed in the usual manner. Both pairs of legs slender, 5-articulate, but rather dissimilar, the posterior ones being, as in the typical Cypridæ abruptly bent upwards and concealed within the shell, last joint of these legs well developed and carrying, in addition to 2 comparatively short setæ, a remarkably elongate claw-shaped spine abruptly reflexed along the leg. Caudal rami more or less imperfectly developed. Ovaria and testicles not entering between the lamellæ of the valves. Ejaculatory tubes in male largely developed, but rather differing in structure from those in the typical Cypridæ, their efferent ducts also dissimilar.

*Remarks.*—The most prominent characters distinguishing the present subfamily are derived from the genital apparatus. In the structure of the maxillipeds some resemblance to the *Pontocyprinæ* is found; but the posterior legs are rather dissimilar, and the caudal rami exhibit an appearance even different from that in all other known Cypridæ. Yet, in most of the structural details the Cyprid type may be found to be well manifested. 2 closely allied genera referable to the present subfamily will be treated of below, and I am of opinion, that the Mediterranean form recorded by G. W. Müller as *Macrocypris succinea* should more properly be regarded as the type of a 3rd genus.



Gen. 4. **Macrocypis**, Brady, 1866.

*Generic Characters*.—Shell very solid, moderately elongate, and acutely produced behind. Inner duplicatures of the valves rather broad, with a narrow transversely striated marginal zone; muscular spots numerous and arranged so as to form together a circular area. Eye wanting. Both pairs of antennæ short and robust, the anterior ones 7-articulate and gradually tapering distally, without any sharp demarcation between the basal and terminal parts, setæ of the latter part short and stout. Posterior antennæ with the terminal part scarcely longer than the basal one, joints rapidly diminishing in size, apical claws slender and elongate. Anterior lip forming in front a rather prominent compressed expansion. Mandibles with the masticatory part rather expanded and coarsely dentate at the edge, palp of moderate size, 4-articulate, and provided at the base with a well developed branchial appendage. Maxillæ with both the palp and the masticatory lobes narrowly produced, vibratory plate of smaller size than usual. Maxillipeds with the masticatory lobe very narrow, conical in shape; palp in female distinctly 4-articulate and armed with 3 slender spines, 2 apical and 1 lateral. Anterior legs with the terminal joint unusually produced and carrying on the tip 2 unequal claws accompanied by a thin bristle. Posterior legs with the outer apical seta rather slender and elongated, recurved spine almost extending to the base of the leg. Caudal rami very small and rudimentary, in the form of 2 thin lappets hinging down from the end of the body, and scarcely at all movable, each lappet provided with a limited number of thin bristles. Copulative appendages of male lamellar, and of comparatively simple structure. Ejaculatory tubes very long and narrow, extending along the dorsal face of the body to beyond the middle of its length, each tube provided with numerous short radiating spikes, which however do not form distinctly defined whorls, proximal extremity of the tube bulbously dilated; efferent duct very long, being immediately on its exit from the tube curled up in a dense spiral coil with highly chitinated walls.

 *Remarks*.—This genus was established in the year 1866 by Brady, to include the form originally recorded by Baird as *Cythere minna* and subsequently (1865) redescribed by the present author, but erroneously referred to the genus *Bairdia* Mc Coy. As pointed out by Brady, the present Ostracod differs in reality very decidedly from the species of that genus, and on the whole approaches much closer to the typical Cypridæ, than does the above-named genus. Only a single species, strictly referable to the present genus, has as yet come under my notice.

7. *Macrocypris minna* (Baird).

(Pl. XXIV &amp; XXV)

*Cythere minna*, Baird, British Entomostraca, p. 171, Pl. 20, figs. 4, 4 a—d.Syn: *Bairdia minna*, G. O. Sars.

*Specific Characters.*—*Female.* Shell moderately tumid, seen laterally, of a somewhat irregular oblong trigonal shape, greatest height a little in front of the middle and about equal to  $\frac{2}{5}$  of the length, dorsal margin forming a bold and quite even curve sloping gradually behind to the posterior corner of the shell, ventral margin nearly straight and horizontal, though exhibiting a slight concavity in front of the middle, anterior extremity rounded off, posterior tapering to an acuminate corner;—seen dorsally or ventrally, oblong fusiform in outline, greatest width in front of the middle and somewhat exceeding  $\frac{1}{3}$  of the length, anterior extremity obtusely pointed, posterior gradually tapered to an acute point; hing-line somewhat flexuous. Valves very little pellucid, with the surface smooth and polished, being almost bare, except at the anterior extremity, where a fringe of extremely fine and delicate hairs may be discerned. Caudal rami sublinear in form, slightly tapered distally, and somewhat curved, each carrying on the tip a slender, somewhat flexuous seta, and in the middle of the dorsal edge a bundle of very small hair-like bristles.

*Male* of rather smaller size than female, but resembling it in the shape of the shell. Prehensile palps of maxillipeds of moderate size and not much dissimilar, propodus oval in form and armed at the end inside with 2 short spines, dactylus somewhat broader on the right than on the left palp. Caudal rami still more rudimentary than in female, and scarcely more than twice as long as they are broad, each ramus tipped with 3 very small bristles. Copulative appendages oblong triangular in outline and terminating in a thin lamella rounded off at the end and somewhat bowed in front.

Colour of shell in both sexes milk-white, limbs more or less deeply tinged with chestnut-brown.

Length of adult female amounting to about 3 millimeters; that of male scarcely exceeding 2.50 mm.

*Remarks.*—This is by far the largest and finest of the marine Cypridæ, and is moreover easily recognisable by the characteristic shape of the shell and its milk-white colour. It is the type of the present genus, in the restriction here adopted.

*Occurrence.*—The present Ostracod is by no means rare on the Norwegian coast. I have met with it not unfrequently in many places, from the Christiania Fjord up to the Lofoten islands, but always only in greater depths, from 50 to

300 fathoms. As could be inferred from the structure of the antennæ, the animal is quite devoid of swimming power, being only enabled to crawl slowly on the bottom, at times burrying itself more or less deeply within the loose mud. Male specimens are rather seldom to be found and may easily escape attention, as they do not differ in the shape of the shell from young female specimens.

*Distribution*.—Shetland Isles (Baird).

*Fossil* in posttertiary deposits of Calabria.

### Gen. 5. **Macrocypria**, G. O. Sars, n.

*Generic Characters*.—Shell very narrow and elongated, acutely produced both in front and behind, with the marginal zone of the valves highly chitinated. Eye absent. Both pairs of antennæ much more slender than in the preceding genus, but, as in it, unadapted for swimming. Oral parts of nearly same structure as in that genus. Maxillipeds with the palps in female less robust, scarcely exceeding the basal part in length and distinctly 4-articulate. Anterior legs very much elongated, with the terminal joint comparatively small and tipped with a single exceedingly long and slender claw accompanied by 2 small bristles. Posterior legs with the 2 apical setæ very small, recurved spine however well developed. Caudal rami movably articulated to the body, and very unlike those in *Macrocypris*, being conspicuously asymmetrical, left ramus much smaller than the right, which is produced in the shape of a highly chitinated mucroniform piece without any armature whatever. Ejaculatory tubes and their eferent ducts of essentially same structure as in *Macrocypris*. Copulative appendages, however, rather dissimilar, not being lamellar, but of very compact structure, and clavate in shape. A pair of scopiform processes present in male, issuing from the ventral face of the body between the bases of the posterior legs.

*Remarks*.—This new genus is established, to include a species formerly referred by the present author to the genus *Macrocypris*. On a closer examination I have however found this species to differ in some respects so decidedly from the type of that genus that I now am of opinion that it more properly ought to be separated generically. The generic name here proposed alludes to the near relationship of this genus to *Macrocypris*.



8. *Macrocypria angusta*, G. O. Sars.

(Pl. XXVIII).

*Bairdia angusta*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 22.Syn: *Macrocypris angusta*, G. O. Sars.

*Specific Characters.*—*Female.* Shell, seen laterally, of a very narrow and elongated form, almost lanceolate in outline, greatest height a little in front of the middle and scarcely exceeding  $\frac{1}{3}$  of the length, dorsal margin evenly arched, though exhibiting near the posterior corner of the shell a slight concavity, ventral margin distinctly sinuated in front of the middle and exhibiting a slight tendency to convexity behind, anterior extremity obliquely produced and terminating below in a sharp dentiform corner, posterior extremity rather more exerted and produced to a narrow somewhat cultrate prominence;—seen dorsally, narrow fusiform in outline, greatest width about in the middle and not attaining  $\frac{1}{3}$  of the length, both extremities sharply pointed. Valves, as in *Macrocypris*, conspicuously unequal, rendering the hing-line somewhat flexuous, surface smooth and polished, only clothed with scattered fine hairs, marginal chitinated zone rather broad at each extremity and crossed by fine striæ. Anterior antennæ with the basal part only slightly dilated, 1st joint of terminal part unusually prolonged, attaining the length of the 3 remaining joints combined, apical setæ rather slender. Posterior antennæ with the terminal part almost twice the length of the basal one, and having the 2nd joint considerably longer than the 1st; apical claws comparatively short. Left caudal ramus simply lanceolate and scarcely more than  $\frac{1}{3}$  as long as the right, which is considerably produced and terminates in a sharp somewhat hamate point.

*Male*, as usual, of somewhat smaller size than female, but resembling it closely in the shape of the shell. Prehensile palps of maxillipeds with the propodus rather narrow, oblong in shape and armed at the end inside with 2 short spines, dactylus abruptly bent at the base. Copulative appendages pronouncedly club-shaped, being attached to the body by a narrow neck, and almost globularly dilated in their outer part, each appendage sending off inside 2 apparently mobile beak-like processes, which give the appendage a certain resemblance to a birds head.

Colour in both sexes pure white.

Length of adult female amounting to 1.80 mm.

*Remarks.*—The above-described form cannot be confounded with any of the other Cypridæ, exhibiting, as it does, a very characteristic outward appearance. The peculiar asymmetry of the caudal rami, at first overlooked, is a quite unique character not found, as far as I know, in any other Ostracoda.



*Occurrence*.—I have met with this form not unfrequently in several places on the Norwegian coast, from the Christiania Fjord to Trondhjem, in moderate depths ranging from 20 to 100 fathoms muddy bottom. In its behaviour the animal agrees with *Macrocypis minna*, being, like it, quite incapable to move freely in the water.

Out of Norway this form has not yet been recorded.

### Subfam. 3. Bairdiinæ.

*Characters of the subfamily*.—Shell of somewhat varying shape and rather firm in consistency, with the valves conspicuously unequal, the left one being the larger. Antennæ not adapted for swimming; the anterior ones with the 3 segments of the basal part well defined, terminal part short, 4 articulate, but sharply marked off from the basal one, and densely setiferous. Posterior antennæ, as in the 2 preceding subfamilies, distinctly 6-articulate, penultimate joint however firmly connected with the preceding joint and more or less prolonged; apical claws only 2 in number, both issuing from the terminal joint. Mandibles and maxillæ on the whole of normal structure. Maxillipeds pronouncedly pediform and, like the 2 succeeding pairs of limbs, ambulatory, though differing from them in the presence of a well developed vibratory plate attached to their base posteriorly. Caudal rami of small size, though well mobile, and built quite on the type of most other Cypridæ. Ovaria and testicles not entering between the lamellæ of the valves. Ejaculatory tubes wholly absent.

*Remarks*.—This is perhaps the most anomalous of the 5 subfamilies comprised within the family *Cypridæ*, and, indeed, on a closer examination of a Mediterranean species belonging to the typical genus *Bairdia*, I found this genus to differ so decidedly from the other known genera, that it appeared to me requirable to establish for its reception a distinct family, *Bairdiidæ*, intermediate between the 2 other families of the Podocopa<sup>1)</sup>. Although this family has been generally accepted by recent authors, I am now of opinion, that the systematic rank of a subfamily would be more appropriate, and that this subfamily should be classed under the head of the *Cypridæ*. Indeed, on a closer examination, it may be recognised, that both in the structure of the shell and in that of the appendages, the *Cyprid* type is more apparent than the *Cytherid*

<sup>1)</sup> Cfr. G. O. Sars, "Ostracoda mediterranea" Arch. f. Math. & Naturvid. f. 1887.

one. True, the presence of 3 pairs of apparently similarly constructed ambulatory legs would seem to approach the *Bairdiinæ* closer to the Cytheridæ than to the *Cypridæ*, in which, as a rule, only a single pair of true ambulatory legs are found. On a closer comparison with the Cyprids treated of in the preceding pages, it is however easily understood that the 1st of those pairs answer to the maxillipeds in these Cypridæ, and that their pediform appearance is only due to an access of growth of the palps, rendering them adapted for locomotion. These legs moreover exhibit a true Cyprid character in the presence, at their base, of a well developed vibratory plate, never found in any of the Cytheridæ. Nor can the perfect similarity of the 2 last pairs of legs be regarded as decisive for a classing of the present subfamily within the Cytheridæ. For in the genus *Paracypris*, which unquestionably is referable to the typical Cypridæ, the posterior legs only very little differ in structure from the anterior ones and may indeed assist them in the crawling movements of the animal<sup>1)</sup>. Another character may here be named, which seems to remove this subfamily from the *Cypridæ*, viz., the absence of ejaculatory tubes in the male. In the *Pontocyprinæ* however, as stated above, these tubes are so imperfectly developed, as to be nearly said to be obsolete. After all, I think that the arrangement here proposed may be found to be acceptable.

The present subfamily as yet only comprises 3 nearly-allied genera, 2 of which are represented in the Fauna of Norway.

## Gen. 6. *Bythocypris* Brady, 1888.

*Generic Characters*.—Shell more or less compressed, of oval or reniform shape, and almost bare of hairs, edges unarmed. Both pairs of antennæ comparatively shorter and stouter than in the type genus; the anterior ones with the apical setæ far less prolonged. Posterior antennæ with the penultimate joint moderately prolonged; apical claws very slender, but unequal in length. Anterior lip only slightly prominent and obtuse at the end. Mandibles with the masticatory part not much expanded, but coarsely dentate; branchial appendage of palp comparatively small, with only 3 setæ, one of which is much elongated. Maxillæ with the masticatory lobes narrowly produced, palp scarcely larger than these lobes and uniarticulate; vibratory plate exhibiting at the base a well marked expansion edged with numerous very thin and

<sup>1)</sup> Cfr. the description of this genus farther on.

slender setæ. Legs of nearly equal length, each terminating in a very slender claw and having the penultimate joint scarcely longer than the preceding joint; vibratory plate of the 1st pair (maxillipeds) somewhat resembling in shape that of the maxillæ, though of smaller size. Caudal rami narrow sublinear in form, and armed on the tip with 2 thin claws, the distal of which is the longer, dorsal edge with a slender seta about i the middle.

*Remarks.*—This genus, established by Brady in 1888, is closely allied to *Bairdia* M'Coy, and its species were indeed formerly referred to that genus. Yet, the shape of the shell is rather different in the 2 genera, and as also some slight differences are found in the structural details, I think that the genus ought to be supported. 2 well defined species referable to this genus will be described below.

### 9. *Bythocypris bosquetiana* (Brady).

(Pl. XXIX).

*Bairdia bosquetiana*, Brady. On new or imperfectly known species of marine Ostracoda. Trans. Zool. Soc. Vol. 5, p. 364, Pl. LVII, figs. 5, a—c,

Syn: *Bairdia complanata*, Brady.

" *Bythocypris reniformis*, Brady.

*Specific Characters.*—*Female.* Shell much compressed, seen laterally, oval reniform in shape, greatest height in the middle and about equal to half the length, dorsal margin forming a bold and quite even curve sloping rather steeply to the hind corner of the shell, ventral margin distinctly sinuated in the middle, anterior extremity broadly rounded, posterior much narrower and exerted to an obtuse corner;—seen dorsally, narrow lanceolate in outline, greatest width about in the middle and scarcely attaining  $\frac{1}{3}$  of the length, both extremities obtusely pointed. Valves but very little pellucid, the left one overlapping the right along the greater part of the dorsal face. Caudal ramus comparatively slender, with the apical claws abruptly curved in the middle, dorsal margin provided, in addition to the slender mediate seta, with a group of 2—4 very small hair-like bristles between it and the base.

Colour pure whitish.

Length of adult female 1.30 mm.

Male unknown.

*Remarks.*—This form was originally recorded in the year 1865 by Brady as a species of the genus *Bairdia*, and was subsequently redescribed as the type of his genus *Bythocypris*, though with a different specific name, viz., *reniformis*. I am also of opinion that the form described by that author in



his well-known monograph as *Bairdia complanata*, and subsequently recorded by the present author under this name, is the very same species.

*Occurrence*.—Only a few female specimens of this form have as yet come under my notice. They were taken, many years ago, at Bekkervig, west coast of Norway, from the considerable depth of 150 fathoms. Norman has however recorded it from 3 other localities of the same coast.

*Distribution*.—Shetland Isles (Brady), Atlantic Ocean, down to 470 fathoms (Brady), Mediterranean (G. W. Müller).

#### 10. *Bythocypris obtusata*, G. O. Sars.

(Pl. XXX, fig. 1).

*Bairdia obtusata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 24.

*Specific Characters*.—*Female*. Shell somewhat less compressed than in the preceding species, seen laterally, irregularly oval in outline, greatest height in the middle and slightly exceeding half the length, dorsal margin evenly arched throughout, ventral only very slightly sinuated, anterior extremity somewhat obliquely blunted below, with indication to an angle above, posterior extremity with the lower corner only very slightly exerted;—seen dorsally, oblong fusiform in outline, greatest width in the middle and about equal to  $\frac{2}{5}$  of the length, both extremities obtusely pointed. Valves rather thin, but only little pellucid, the left one overlapping the right almost along the whole dorsal face. Structure of the several limbs very like that in the preceding species. Apical setæ of the anterior antennæ, however, comparatively shorter, and the vibratory plate on the 1st pair of legs (maxillipeds) of smaller size. Caudal rami somewhat less produced, and having the apical claws almost straight, seta of dorsal edge accompanied above by a short bristle.

Colour whitish, with a slight pale yellow tinge.

Length of adult female 1.13 mm.

*Male* unknown.

*Remarks*.—The above-described form is evidently congeneric with the preceding one, though easily distinguishable by the somewhat different shape of the shell. It is also rather inferior in size.

*Occurrence*.—At first I had at my disposal only an empty shell of this form picked up by my late father from shell-sand taken up by the aid of the dredge from a depth of 80—90 fathoms at Abelsnæs, south coast of Norway. Subsequently however I succeeded in obtaining some perfect specimens in the same locality where the preceding species occurred, and have thereby been enabled



to examine more closely the structural details. This species has also been recorded by Norman from some localities on our western coast.

*Distribution*.—British Isles (Brady).

*Fossil* — Calabria (Seguenza).

### Gen. 7. **Bairdia**, M'Coy, 1844.

Syn: *Nesidea*, Costa.

*Generic Characters*.—Shell short and tumid, more or less pronouncedly rhomboid in shape, with the edges of the valves in most cases denticulate at one or both extremities; surface in fresh specimens more or less densely clothed with coarse recurved hairs. Both pairs of antennæ considerably more slender than in the preceding genus, the anterior ones carrying on the end a dense fascicle of exceedingly long and slender setæ; penultimate joint of the posterior ones remarkably long and narrow. Mandibles and maxillæ of essentially same structure as in *Bythocypris*. Legs however still more slender, with the penultimate joint very long and narrow. Vibratory plate attached to the 1st pair of legs (maxillipeds) rather larger than in that genus. Caudal rami with several additional setæ on the dorsal edge, apical claws very unequal in size, the proximal one being much the longer and almost setiform. None of the legs in male transformed; copulative appendages short and compact.

*Remarks*.—This genus was established as early as the year 1844 by M'Coy, to comprise a number of fossil Ostracoda from the carboniferous limestone of Ireland. Some of the forms included by him in that genus are however apparently not congeneric, and for this reason most recent authors have found it advisable to substitute the name *Bairdia* with that of *Nesidea*, proposed by Costa for a species unquestionably belonging to the present genus. As however the former name is the elder one, it ought certainly to be retained, though the genus must be taken in a more restricted sense than done by M'Coy.

A single species only, referable to the present genus, is represented in the Fauna of Norway.

11. *Bairdia inflata* (Norman).

(Pl. XXX, fig. 2)

*Cythere inflata*, Norman, Species of Ostracoda new to Britain. Ann. Mag. Nat. Hist. Vol. IX, p. 49, Pl. III, figs. 6—8.

Syn: *Bairdia obliquata*, G. O. Sars.

„ — *subdeltoidea*, White (not Münster).

*Specific Characters.—Female.* Shell very tumid, seen laterally, oval rhomboid in outline, greatest height about in the middle and somewhat exceeding half the length, dorsal margin boldly arched and sloping rather steeply to the hind corner of the shell, ventral margin nearly straight, anterior extremity obliquely truncated, projecting above in an obtuse corner, posterior extremity somewhat exerted below, but obtuse at the end;—seen dorsally, broadly ovate in outline, greatest width about in the middle and considerably exceeding half the length, both extremities sharply pointed. Valves conspicuously unequal, the left one overlapping the right considerably in the middle of the dorsal face, hind edge of each valve irregularly dentated below; surface smooth, but of a somewhat dull appearance from numerous small impressed pits.

Colour not yet ascertained.

Length of adult female 1.12 mm,

*Male* unknown.

*Remarks.*—This form was originally described in the year 1862 by Norman as a species of the genus *Cythere*, and was subsequently erroneously identified by White with the fossil species, *B. subdeltoidea* (Münster). Nor can the Mediterranean form described in detail by the present author under the latter name be adduced to that species, but may more probably be identical with one of the 10 closely allied species recorded by G. W. Müller from the gulf of Naples. As pointed out by Brady, the *B. obliquata* of the present author is identical with Norman's species.

*Occurrence.*—My knowledge to this form is confined to the examination of 2 empty valves probably of the same specimen, found by my late father in shell-sand from Øxfjord, on the Finmark coast. Norman has however recorded this form from 3 localities on the west coast of Norway, and I have had an opportunity of seeing some of his specimens.

*Distribution.*—British Isles (Brady), Fosse de Cap Breton (Marquis de Folin).

*Fossil* in post-tertiary deposits of Scotland.

## Subfam. 4. Cyprinæ.

*Characters of the subfamily.*—Shell of very varying shape, and generally thin, never calcareous. Antennæ in some cases not serviceable for swimming, but in the greater number of forms well adapted for this purpose; the anterior ones with the first 2 segments of the basal part imperfectly defined and more or less dilated, terminal part well marked off from the basal one, rather slender, and generally 5-articulate. Posterior antennæ with the terminal part, as a rule, only composed of 3 joints, the 1st of which is much the largest and provided behind with a comparatively small sensory appendage; apical claws 5 in number, 3 of them issuing from the penultimate joint. Mandibles and maxillæ normally developed. Maxillipeds with the masticatory lobe well defined and clothed at the end with curved spines or setæ, in most cases also provided at the base behind with a more or less distinctly developed vibratory lamella; palp in female poorly developed, not pediform, and forming, as a rule, a simple inarticulate, and immobile lappet tipped with 3 unequal bristles, that in male, as usual, transformed to a grasping organ. Anterior legs in some cases rather slender, but more generally shorter and stouter than in the Cypridæ treated of in the preceding pages. Posterior legs more or less dissimilar, and generally upturned within the shell. Caudal rami rarely rudimentary, being in most cases well developed and very mobile, rod-like in shape, and armed at the tip with 2 more or less slender claws, dorsal edge generally provided with only a single small bristle. Germinal part of ovaria and testicles, as also the coecal tubes of the intestine, lodged between the lamellæ of the valves. Ejaculatory tubes always distinctly developed, and provided with numerous radiating chitinous spikes arranged in well-defined whorls; eferent ducts simple, not convoluted, as in the *Macrocyprinæ*.

*Remarks.*—This subfamily comprises the more typical Cypridæ, nearly all of which are confined to fresh waters, only 2 genera, *Paracypris* and *Aglaia*, being as yet known as strictly marine.

Owing to the great number of genera referable to this subfamily, a systematic grouping of them would seem to be desirable, and has indeed been attempted by several authors, though in a rather different manner. In any case these groups cannot deserve the systematic rank of subfamilies, but only that of subordinate sections. In way of distinction from the true subfamilies, they are here spelt with the termination "ides" instead of "inæ". 6 such groups will be recorded in the sequel, and to each of them a few short remarks will be added; but I have not found it necessary to give full diagnoses of them,



## Group 1. Paracyprides.

*Remarks.*—To this group I provisionally refer the 4 following genera: *Paracypris* G. O. Sars, *Aglaia* Brady, *Paracypria* G. O. Sars, and *Phlyctenophora* Brady. These 4 genera seem to agree pretty well in the structure of the genital apparatus, as also on the whole in that of the limbs, and exhibit some relations to the next 2 groups, *Candonides* and *Cyclocyprides*, though being scarcely referable to either of them. Only the 1st of these genera is represented in the Fauna of Norway.

### Gen. 8. *Paracypris*, G. O. Sars, 1865

*Generic Characters.*—Shell elongate compressed, narrowly produced behind, and of rather firm consistency, with the edges highly chitinated. Eye well developed. Antennæ not adapted for swimming; the anterior ones slender, but with the setæ of the terminal part comparatively short. Posterior antennæ without any trace of natatory setæ, sensory appendage of the 1st terminal joint pronouncedly club-shaped; apical claws moderately slender. Anterior lip only slightly prominent. Mandibles of quite normal structure. Maxillæ with the masticatory lobes narrowly produced; palp likewise narrow, with the apical joint longer than broad. Maxillipeds provided at the base with a small, but well defined vibratory lamella, palp (in female) simple; sub-linear in shape. Both pairs of legs much elongated and only slightly differing in structure, each carrying on the tip a long curved claw; the posterior ones, however, more recurved, and having on the tip 2 unequal bristles in addition to the claw, the one abruptly reflexed. Caudal rami rather fully developed, and resembling somewhat in shape those in the genus *Candona*, though having 2 setæ on the dorsal edge.

*Remarks.*—This genus was established in the year 1865 by the present author, to include a Cyprid, which, on a closer examination, was found to approach the typical freshwater forms more closely than any of the other marine Cypridæ observed; hence the generic name proposed. Indeed, the structure of the posterior antennæ and in particular that of the maxillipeds clearly proves it to be referable to the subfamily *Cyprinæ*, as here defined. The genus *Aglaia* of Brady seems to be very nearly related to the one here in question, though differing rather conspicuously in the shape of the shell. A single species only of the present genus is as yet known to me.



12. *Paracypris polita*, G. O. Sars.

(Pl. XXXI)

*Paracypris polita*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 12.

*Specific Characters.*—*Female.* Shell much compressed, seen laterally, of a very narrow, almost cuneiform shape, being gradually attenuated behind, greatest height far in front of the middle and only slightly exceeding  $\frac{1}{3}$  of the length, dorsal margin abruptly arched in front and sloping steeply behind, ventral margin distinctly sinuated, anterior extremity well rounded, posterior much exerted and tapering to an obtuse point;—seen dorsally, narrow lanceolate in outline, greatest width somewhat in front of the middle and not nearly attaining  $\frac{1}{3}$  of the length, both extremities obtusely pointed. Valves nearly equal, with the surface smooth and polished and almost devoid of any hairy clothing; inner duplicatures rather broad, marginal zone highly chitinated and crossed by fine arborescent stripes, being particularly broad ventrally. Caudal rami somewhat curved and slightly tapering distally, apical claws rather strong, dorsal setæ subequal, somewhat recurved, and attached at a short distance from the end.

Colour of shell pale yellow, with an irregular flexuous band of a reddish brown hue along the ventral side of the valves.

Length of adult female amounting to 1.30 mm.

*Male* unknown.

*Remarks.*—In the outward appearance this form bears a certain resemblance to some of the *Pontocyprinæ*, particularly to the species of the genus *Erythrocypris*, but may be readily distinguished from these species by the perfectly smooth and polished surface of the shell and by the want of any obvious hairy clothing. In the structure of the limbs it differs very decidedly from any forms of that subfamily, and it is only in the shape of the sensory appendage of the posterior antennæ that some agreement with those forms is found.

*Occurrence.*—I have met with this handsome Ostracod in several localities on the south and west coasts of Norway, at moderate depths, but nowhere in any abundance. All the specimens obtained were of the female sex. The animal is quite devoid of swimming power, but crawls rather dexterely along the bottom, at times burrowing more or less deeply into the loose mud.

*Distribution.*—British Isles (Brady), Bay of Biskaye, Mediterranean (Norman).

*Fossil* in postglacial beds of Norway, Scotland and Sicily.

## Group. 2. Candonides.

*Remarks.*—The type of this group is the well-known freshwater genus *Candona*, to which in recent time several other genera have been added, exhibiting a more or less close relationship to that genus, and thus, together with it, forming a well defined group of the subfamily Cyprinæ. All the forms referable to this group agree in their entire lack of swimming power, being only found at the bottom of lakes or swamps. 3 genera of this group are represented in the Fauna of Norway.

### Gen. 9. *Candona*, Baird, 1850.

*Generic Characters.*—Shell oval or reniform in shape, with the surface smooth, of whitish colour, and often exhibiting a pearly lustre. Eye imperfectly developed. Anterior antennæ moderately slender, with the terminal part not very sharply marked off from the basal one, and distinctly 5-articulate. Posterior antennæ without any trace of natatory setæ, penultimate joint in male subdivided and provided at the junction with 2 peculiar rod-like spines, apparently of sensorial nature. Anterior lip evenly rounded in front. Mandibles quite normally developed. Maxillæ with the masticatory lobes short and stout, palp rather prominent, with the apical joint broader than long and obliquely truncated at the end. Maxillipeds without any distinctly defined vibratory lamella at the base, palp in female simple, lash-shaped, in male, as usual, transformed and prehensile, but with the dactylus and propodus confluent. Anterior legs moderately slender and of normal structure; posterior ones rather dissimilar, being of smaller size and upturned within the shell-cavity, last joint provided with 3 setæ, one of which is generally much smaller than the other 2, which are not much different in length and extend in opposite directions. Caudal rami slightly differing in shape in the different species, but armed in the usual manner. Copulative appendages in male rather compact, exhibiting, as a rule, one or two irregularly rounded lappets at the end. Ejaculatory tubes comparatively large, but only provided with 7 whorls of radiating spikes; proximal extremity of the tubes funnel-shaped.

*Remarks.*—This genus was established as early as the year 1850 by Baird, to include 4 species, one of them (*C. lucens*,) being apparently identical with *Cypris candida*, O. Fr. Müller. Subsequently many other species have been added by different authors, and this genus has indeed proved to be one

of the most comprehensive of the Cypridæ. On this reason a grouping of the numerous species has been attempted by some recent authors; but it appears to me that the limits of these groups are very difficult to define precisely.

All the species of the present genus seem to be confined to the northern hemisphere. I have no knowledge of any true *Candona* being found south of the line.

### 13. *Candona candida*. (O. Fr. Müller).

(Pl XXXII & XXXIII).

*Cypris candida*, O. Fr. Müller, Entomostraca, p. 62, Pl. VI, figs. 7—9.

Syn: *Monoculus candidus* Jurine.

„ *Candona lucens*, Baird.

*Specific Characters.*—*Female*. Shell moderately tumid, seen laterally, irregularly oval or sub-triangular in outline, higher behind than in front, greatest height considerably exceeding half the length, dorsal margin evenly arched, sloping very steeply behind, but rather slowly in front, ventral margin slightly sinuated, anterior extremity narrowly rounded, posterior obliquely deflexed and terminating below in an obtuse corner; — seen dorsally, oblong oval in outline, greatest width in the middle and nearly attaining half the length, both extremities obtusely pointed. Valves only slightly pellucid and of rather firm consistency, surface smooth and shining, with distant small pits, and only sparingly hairy at each extremity; inner duplicatures moderately broad. Vibratory plate of maxillipeds replaced by a single seta. Posterior legs only 4-articulate, the penultimate joint not being subdivided, all 3 apical setæ well developed, though of somewhat different length. Caudal rami conspicuously curved and slightly attenuated, apical claws rather strong, the distal one about half the length of the ramus, dorsal seta well developed and attached at a distance from the tip about equal to  $\frac{1}{3}$  of the length of the ramus. Genital lobes of moderate size and produced behind to a subtriangular corner.

*Male* slightly larger than female, but scarcely differing in the shape of the shell, except by the somewhat deeper ventral sinus. Prehensile palps of maxillipeds not much dissimilar, both being subfusiform in shape, with 2 thickish setæ inside the middle and the dactylar part somewhat thickened at the end; right palp however a little broader than the left and more curved. Caudal rami scarcely at all curved, but otherwise of same structure as in female. Copulative appendages with one of the terminal lappets extending upwards at almost right angle to the axis of the appendage.

Colour in both sexes pure white, with the dark contents of the intestine only faintly traced through the shell.

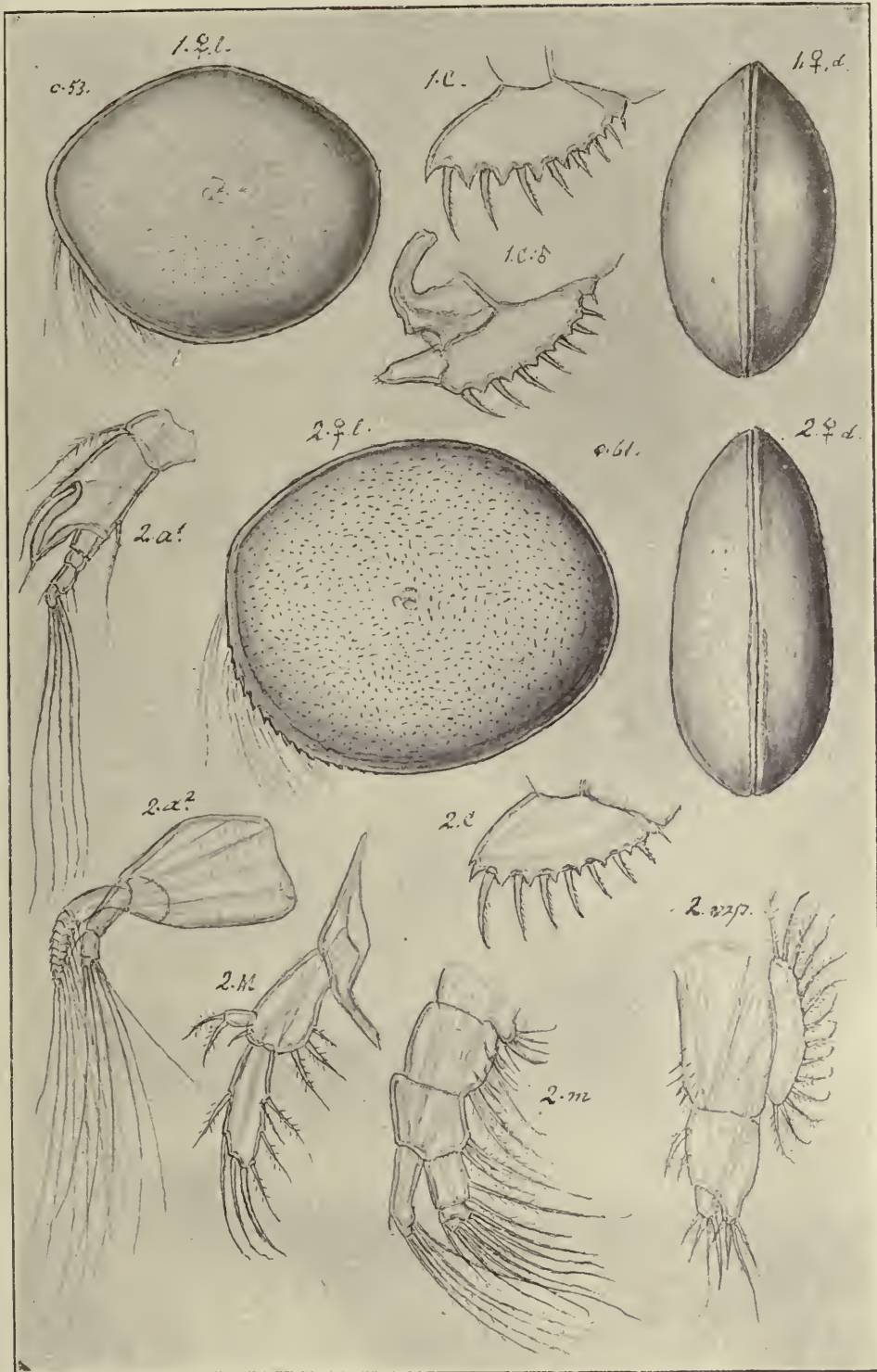


# Ostracoda

Polycopidæ

Cladocopa

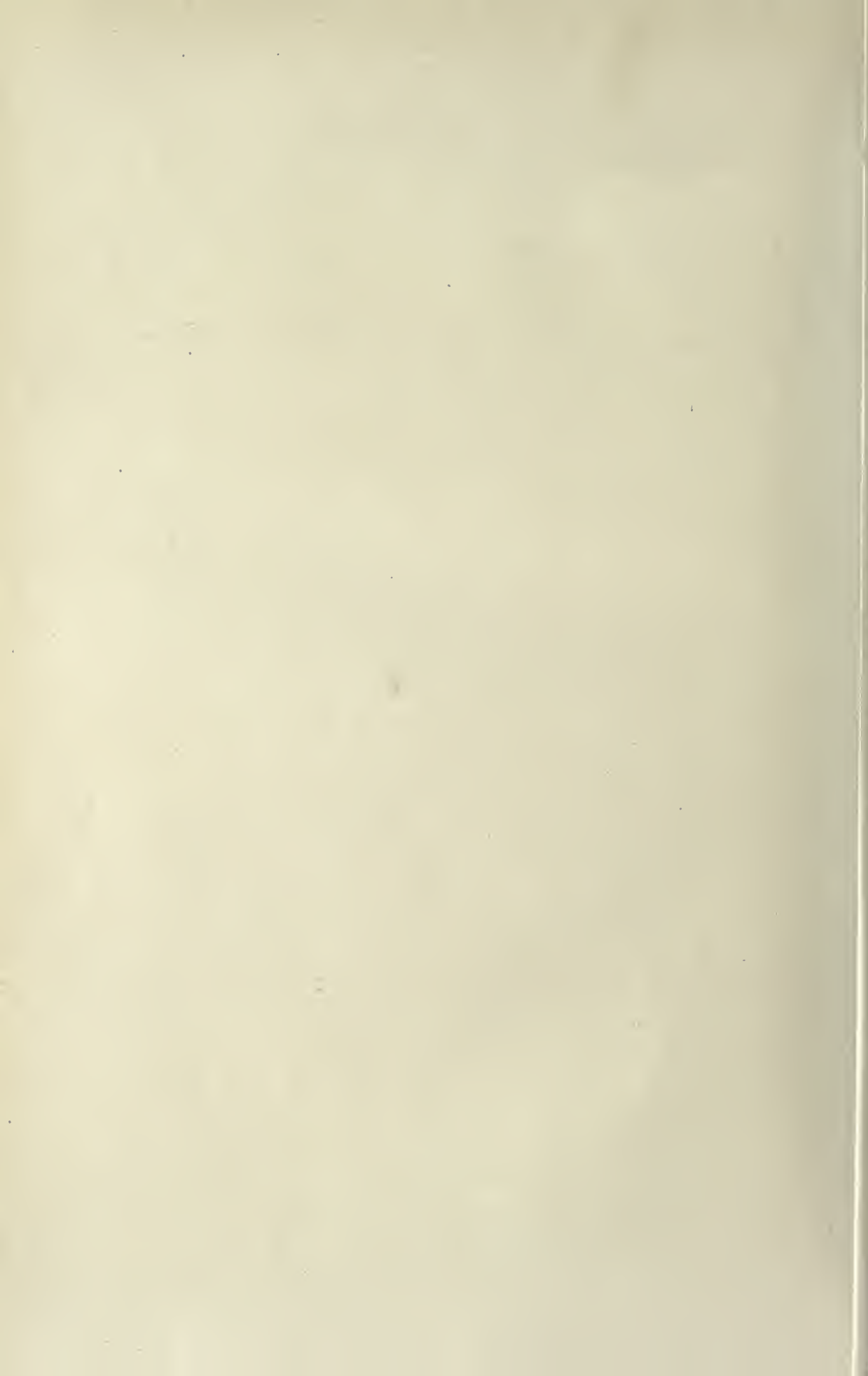
Pl. XVII



G. O. Sars del.

1. *Polycope sublævis*, G. O. Sars
2. *Polycopsis compressa* (Brady & Rob.)



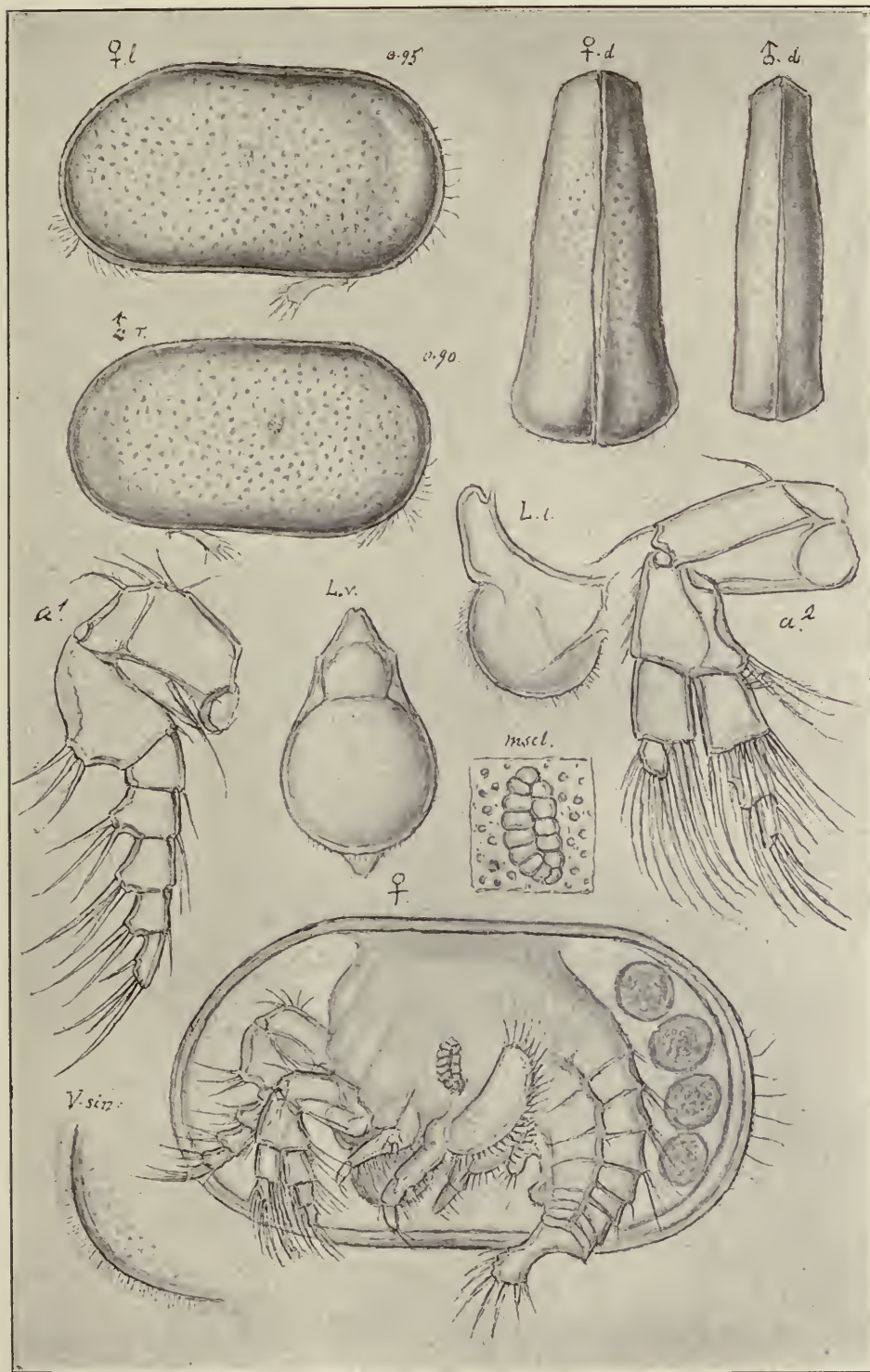


# Ostracoda

Cytherellidæ

Platycopa

Pl. XVIII



G. O. Sars del.

*Cytherella abyssorum*, G. O. Sars



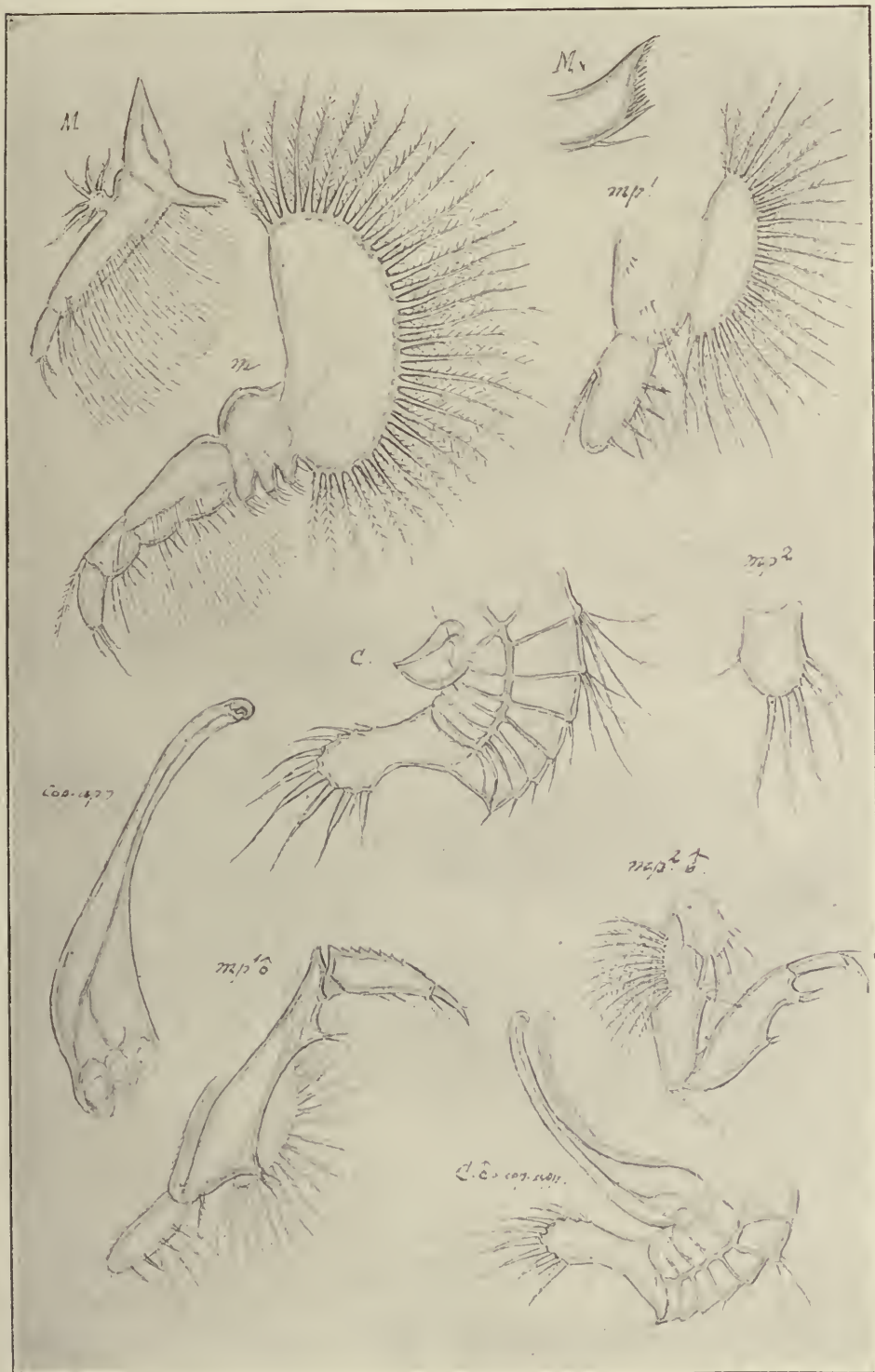


# Ostracoda

Cytherellidæ

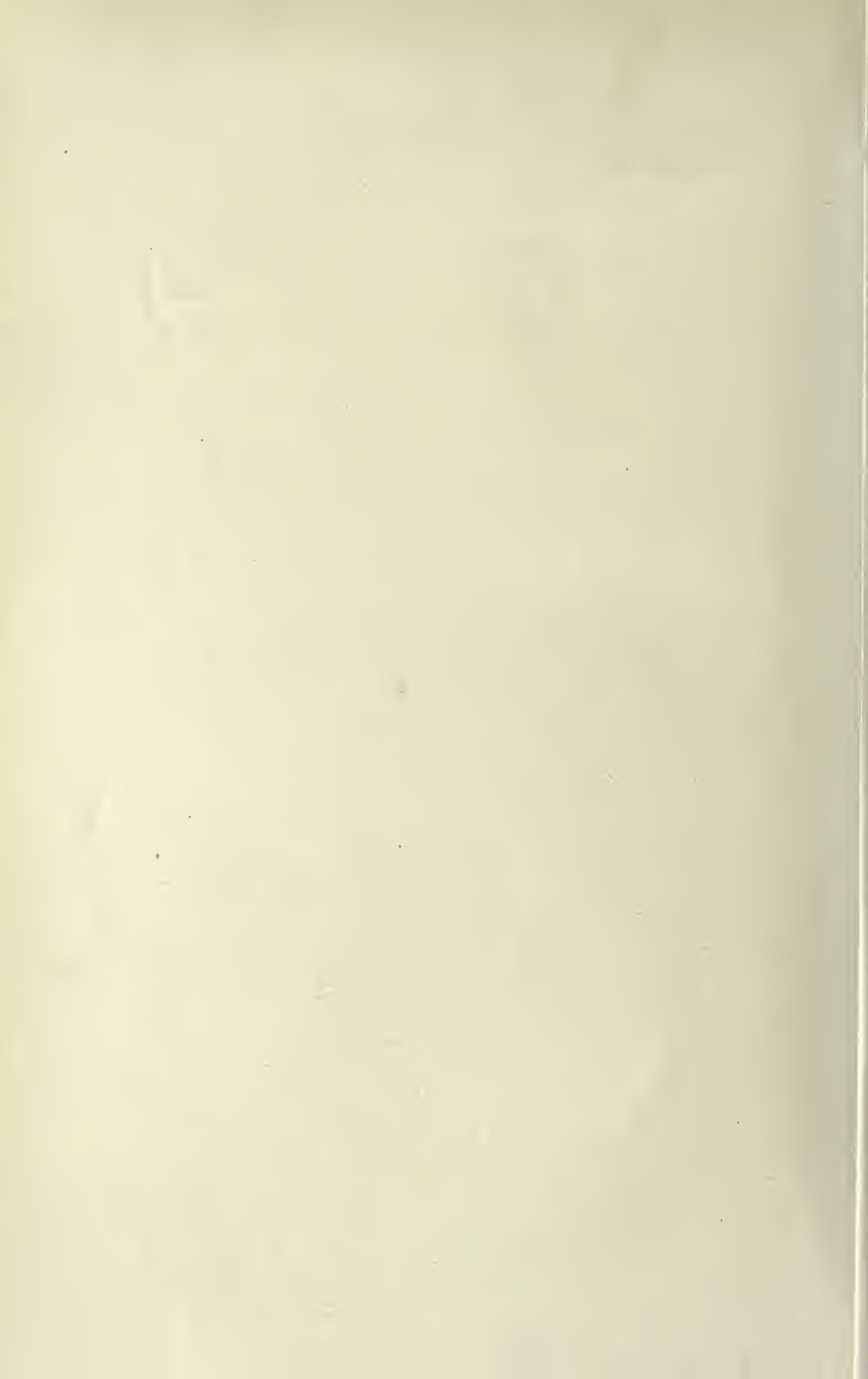
Platycopa

Pl. XIX



G. O. Sars del.

*Cytherella abyssorum*, G. O. Sars  
(continued)

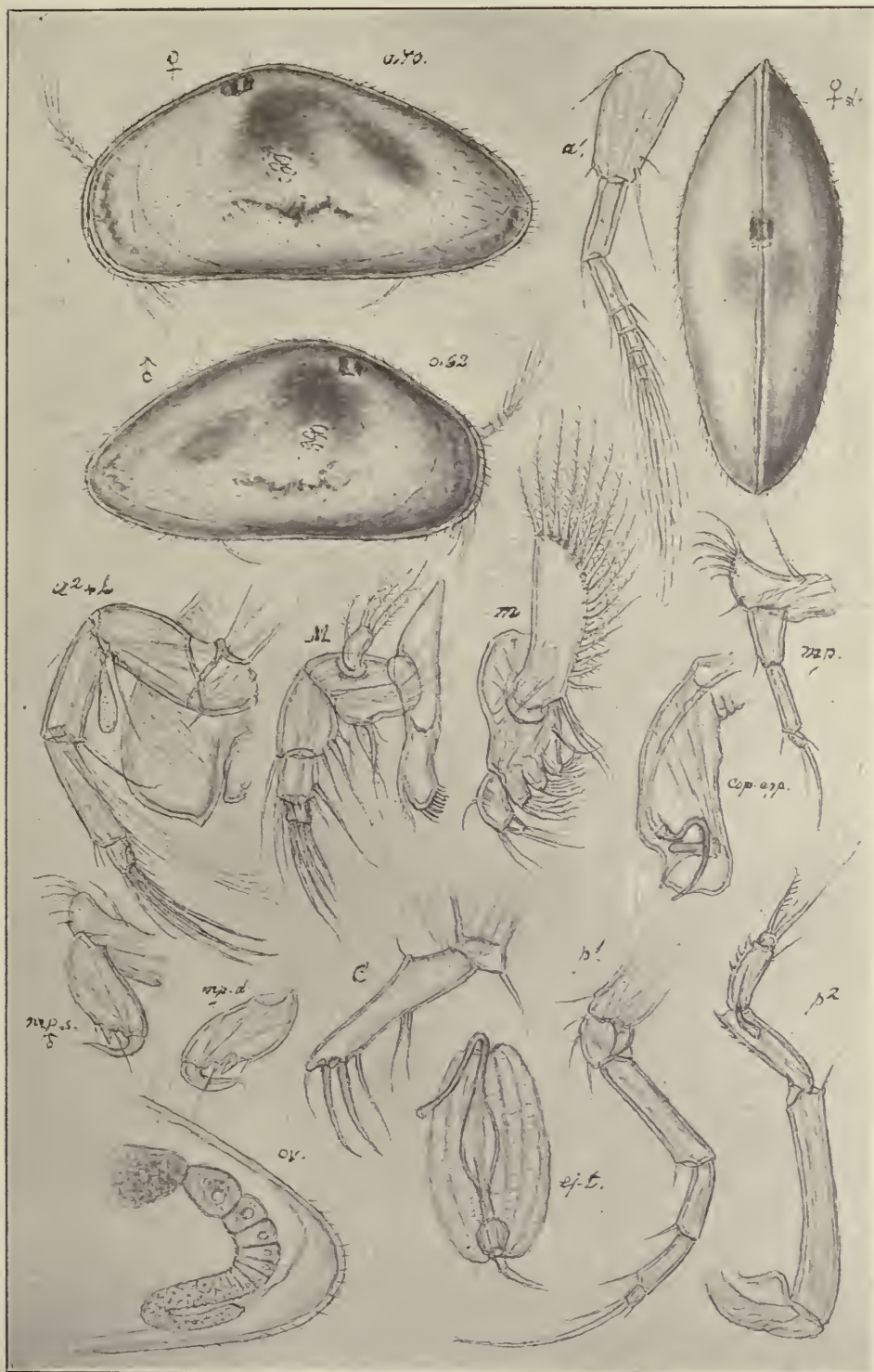


# Ostracoda

Cypridæ

Podocopa

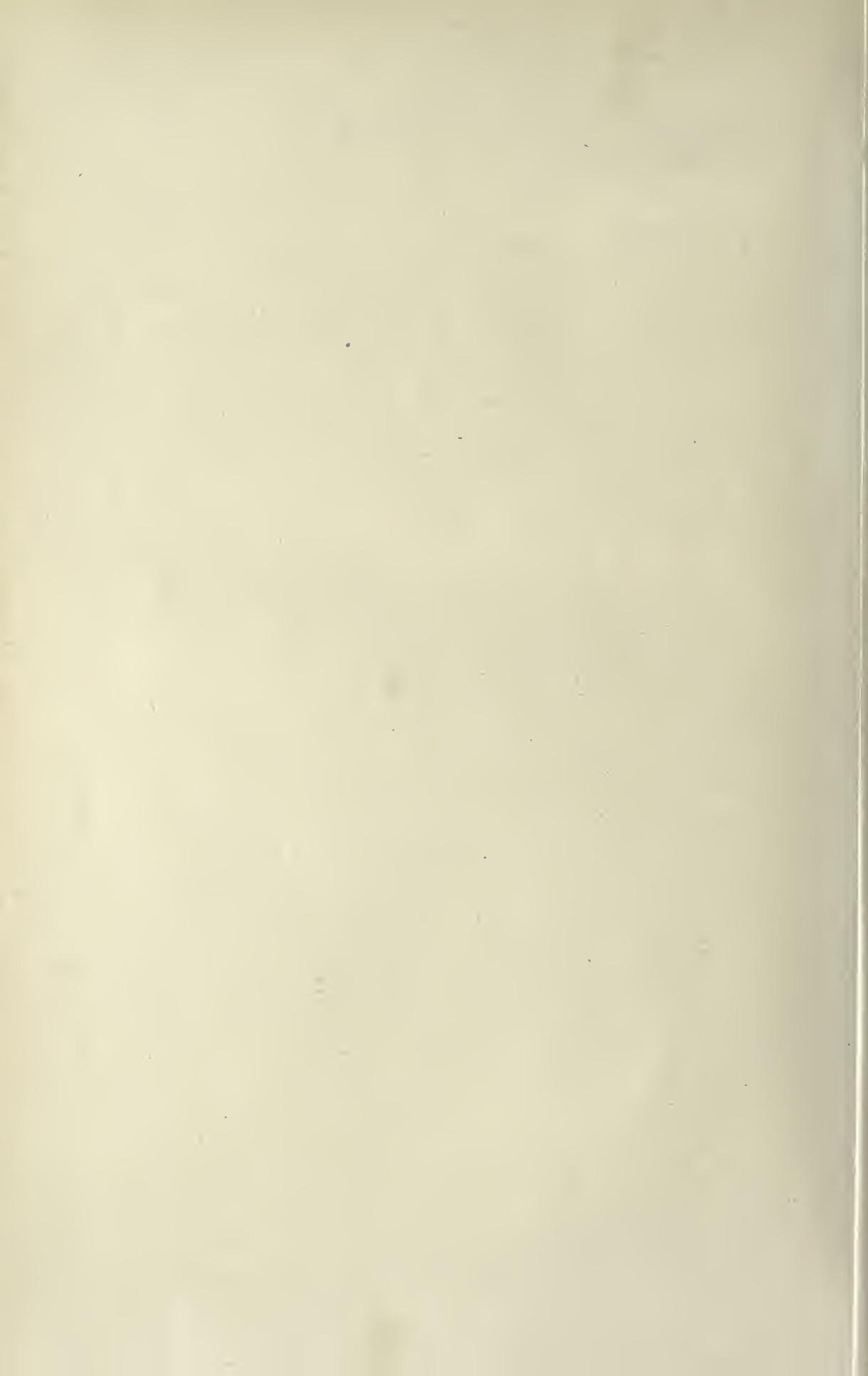
Pl. XX



G. O. Sars del.

*Pontocypris trigonella*, G. O. Sars



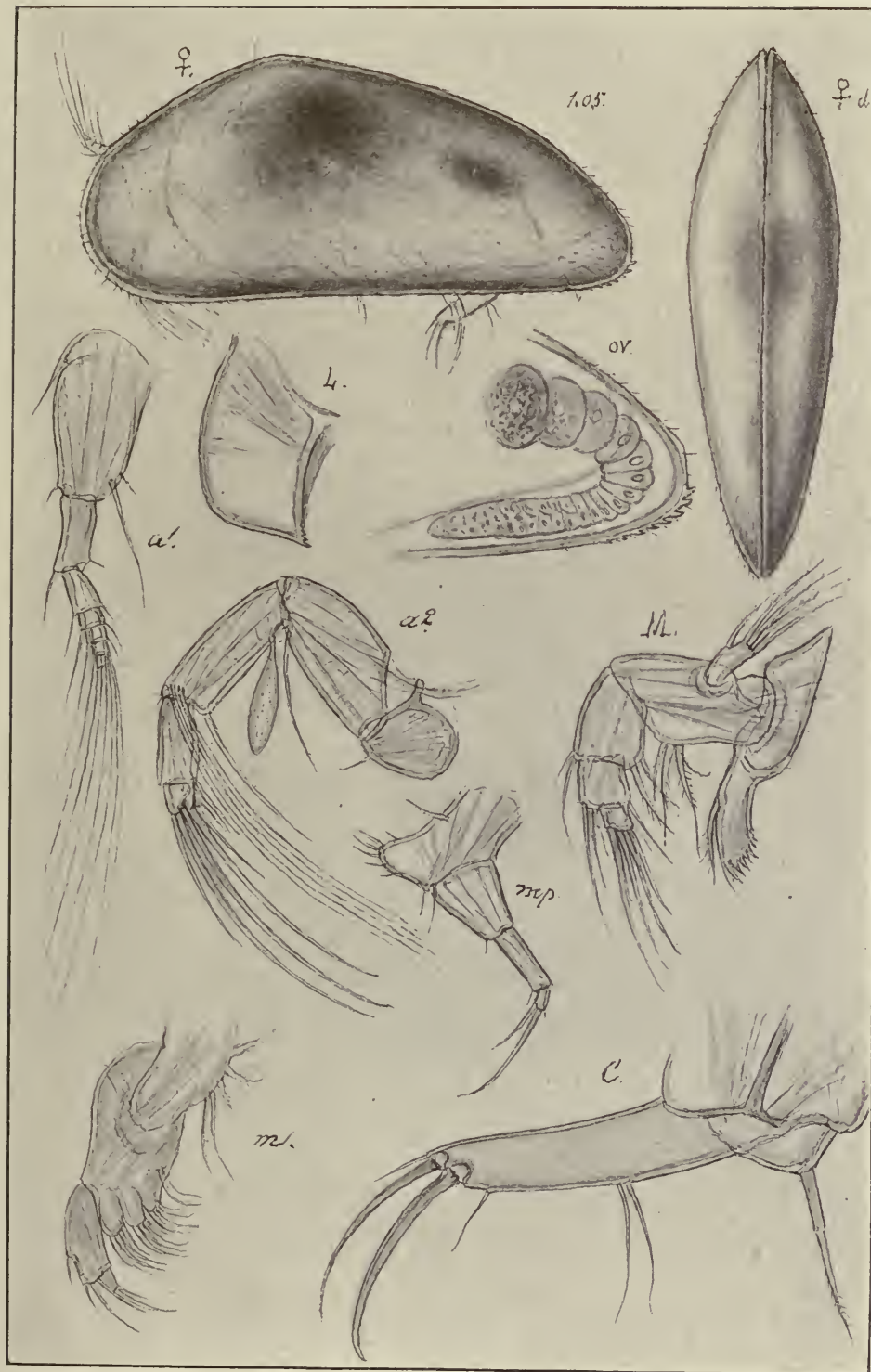


# Ostracoda

Cypridæ

Podocopa

Pl. XXI



G. O. Sars del.

*Erythrocypris mytiloides* (Brady)



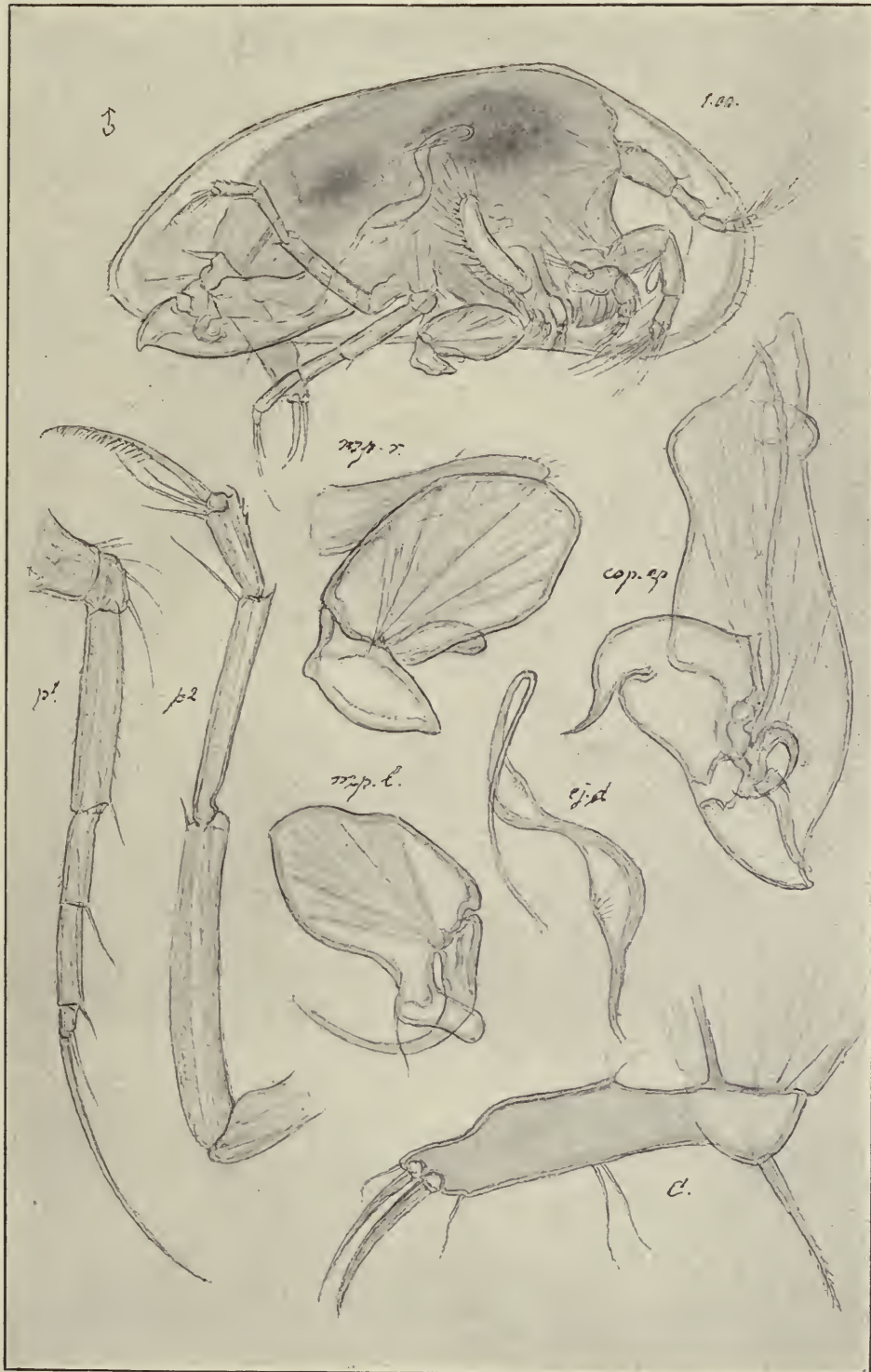


# Ostracoda

Cypridæ

Podocopa

Pl. XXII



G. O. Sars del.

*Erythrocypris mytiloides* (Brady)  
(Male)

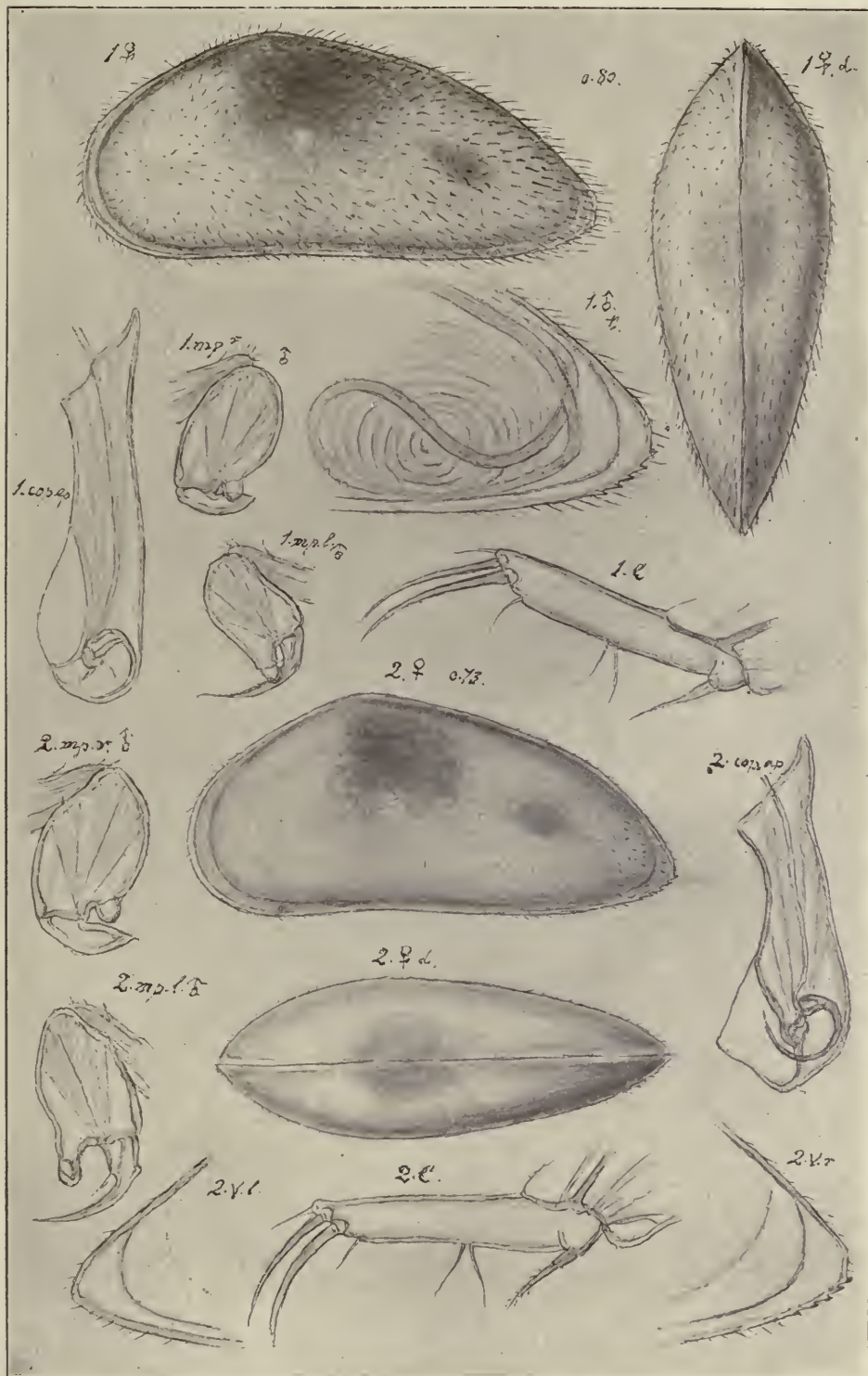


# Ostracoda

Cypridæ

## Podocopa

Pl. XXIII



G. O. Sars del.

1. *Erythrocypris hispida*, G. O. Sars
2. „ *pallida*, G. W. Müller



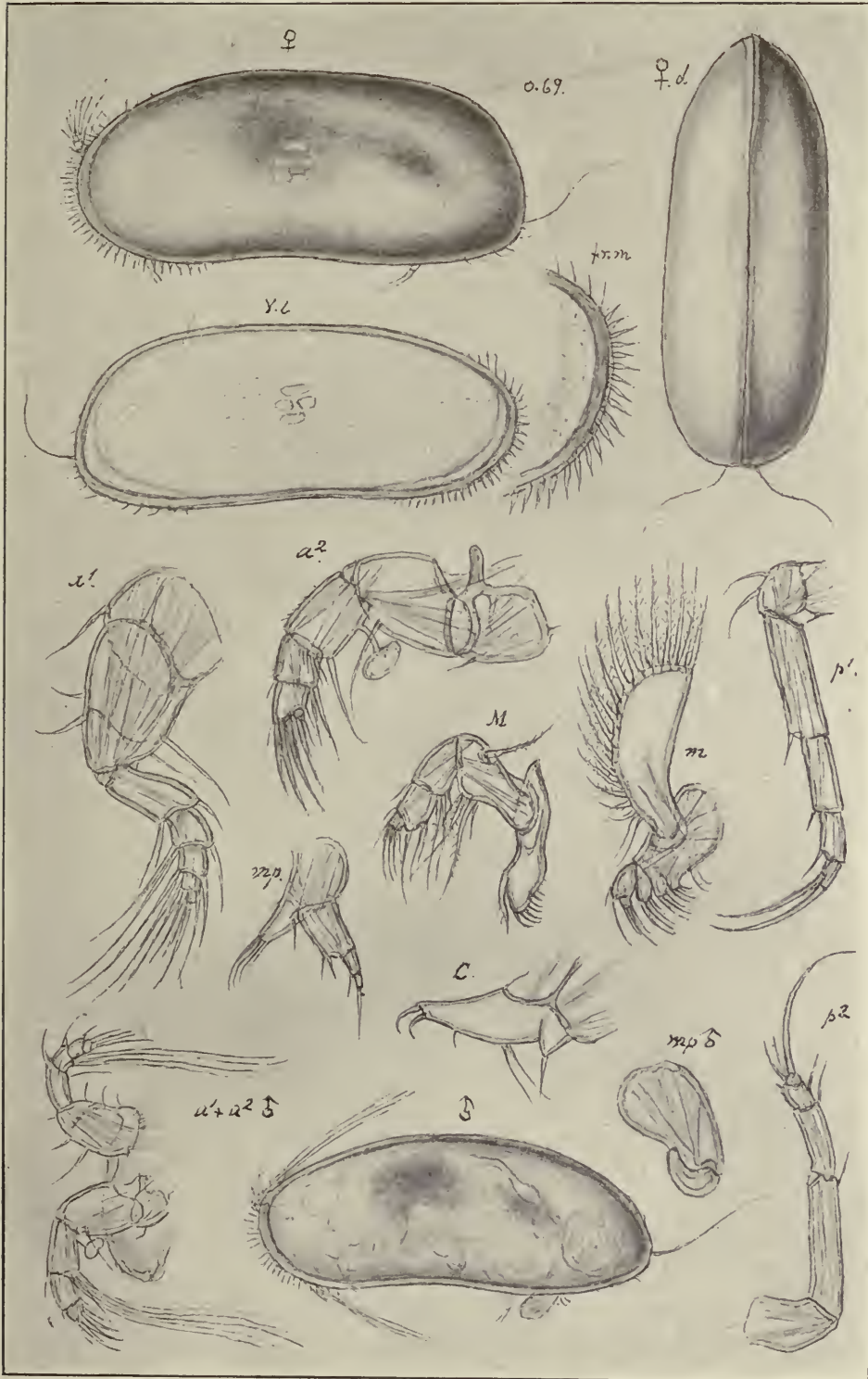


# Ostracoda

Cypridæ

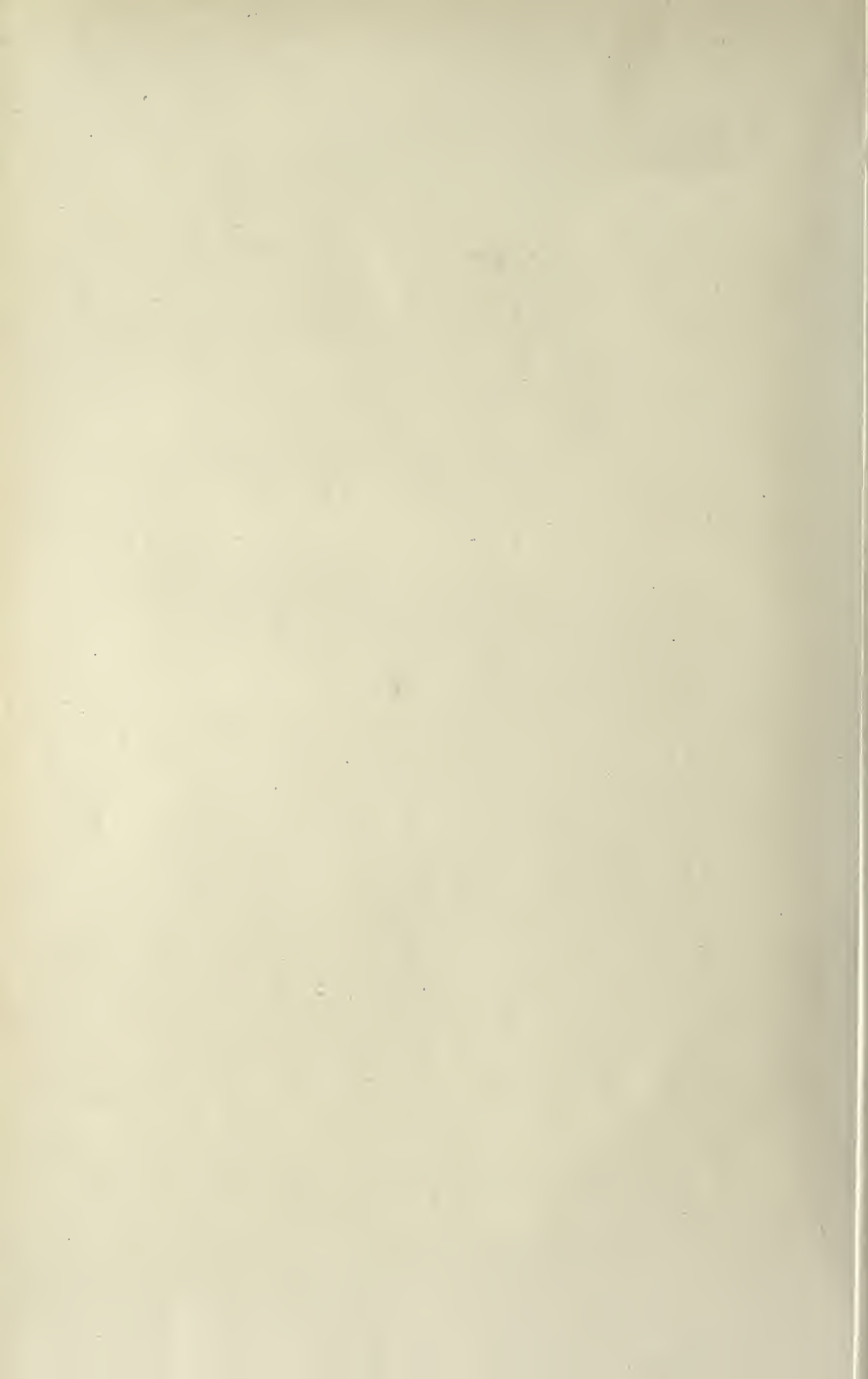
Podocopa

Pl. XXIV



G. O. Sars del.

*Argillœcia cylindrica*, G. O. Sars



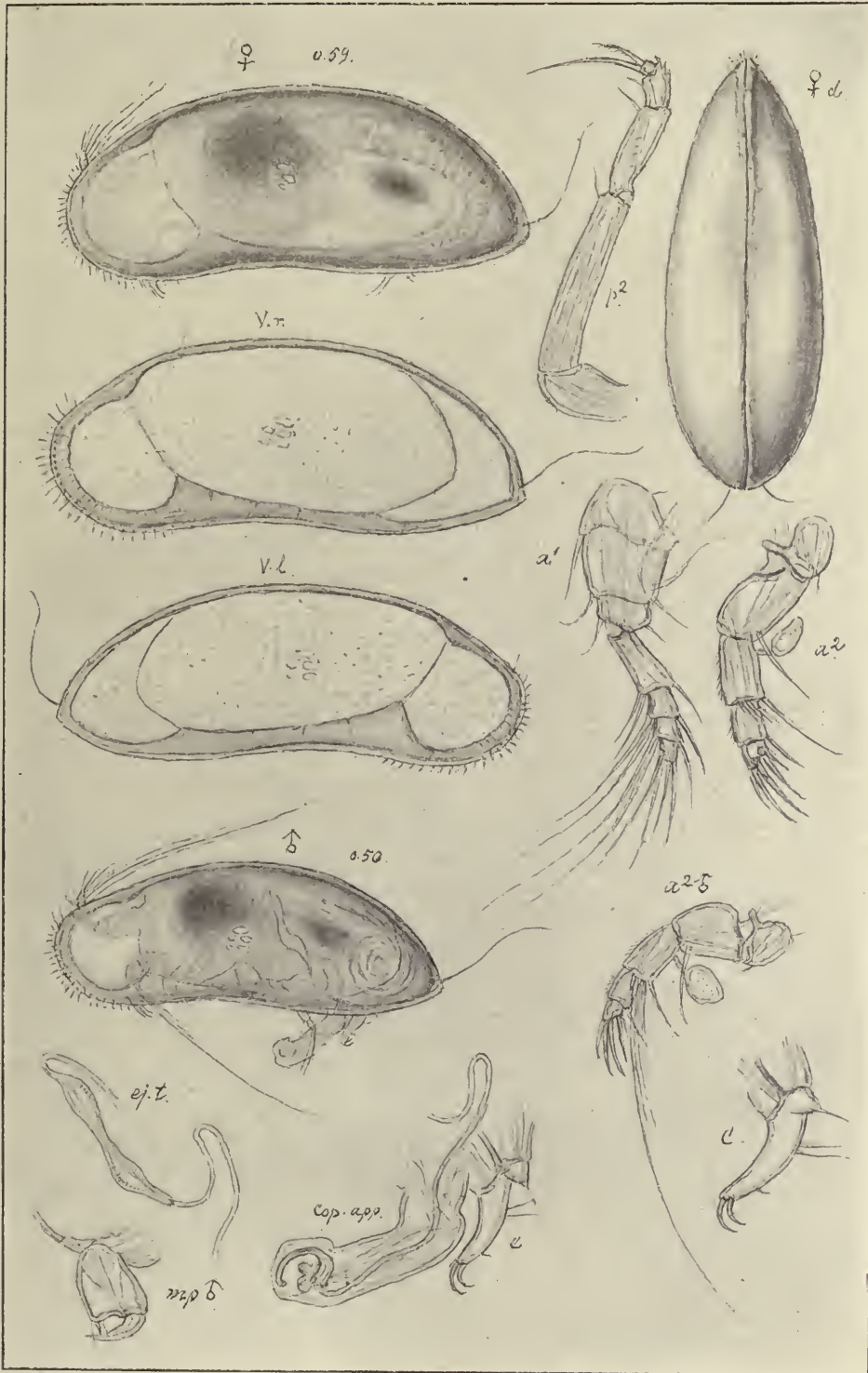


# Ostracoda

Cypridæ

Podocopa

Pl. XXV



G. O. Sars del.

*Argillœcia conoidea*, G. O. Sars

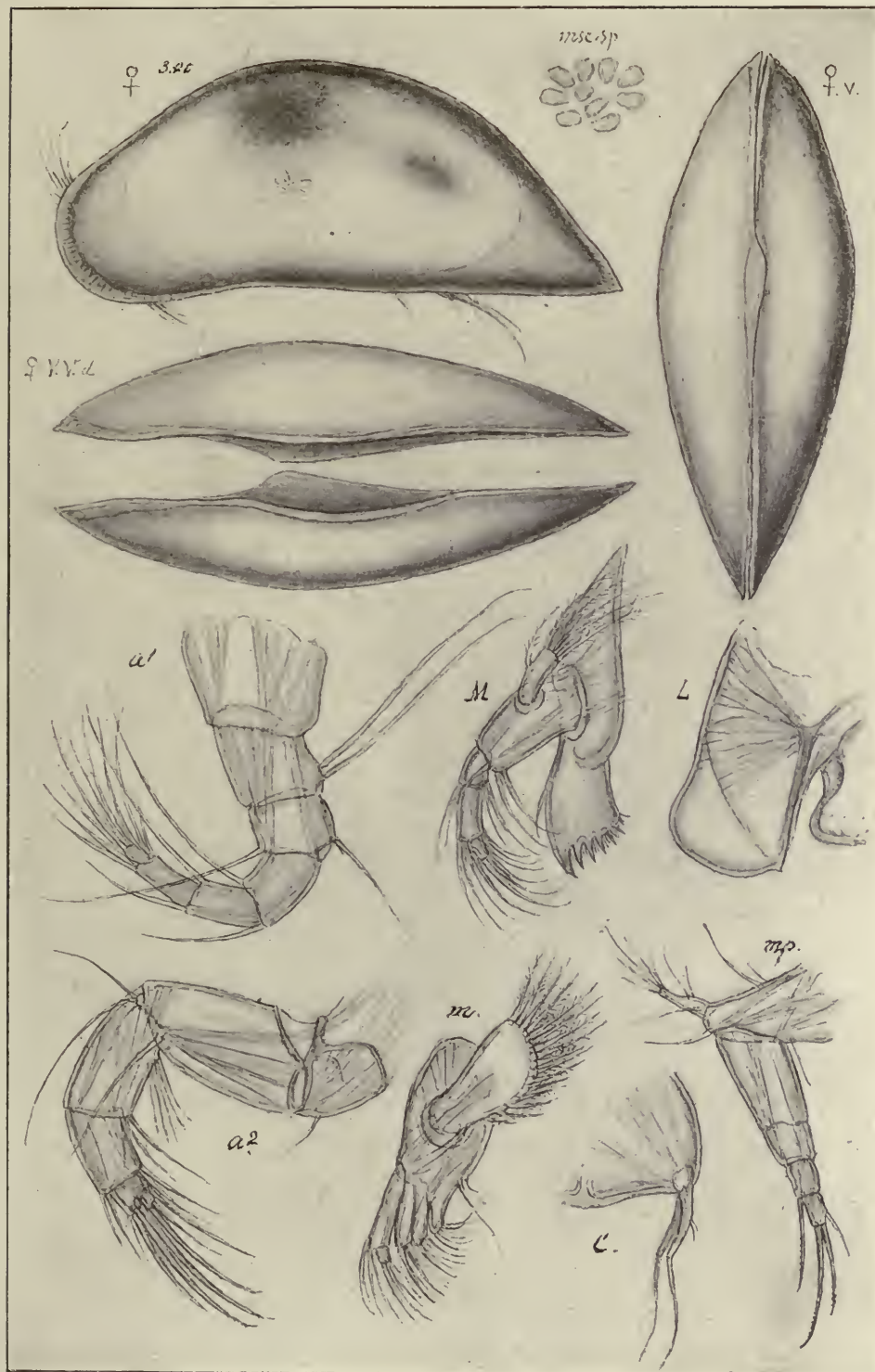


# Ostracoda

Cypridæ

Podocopa

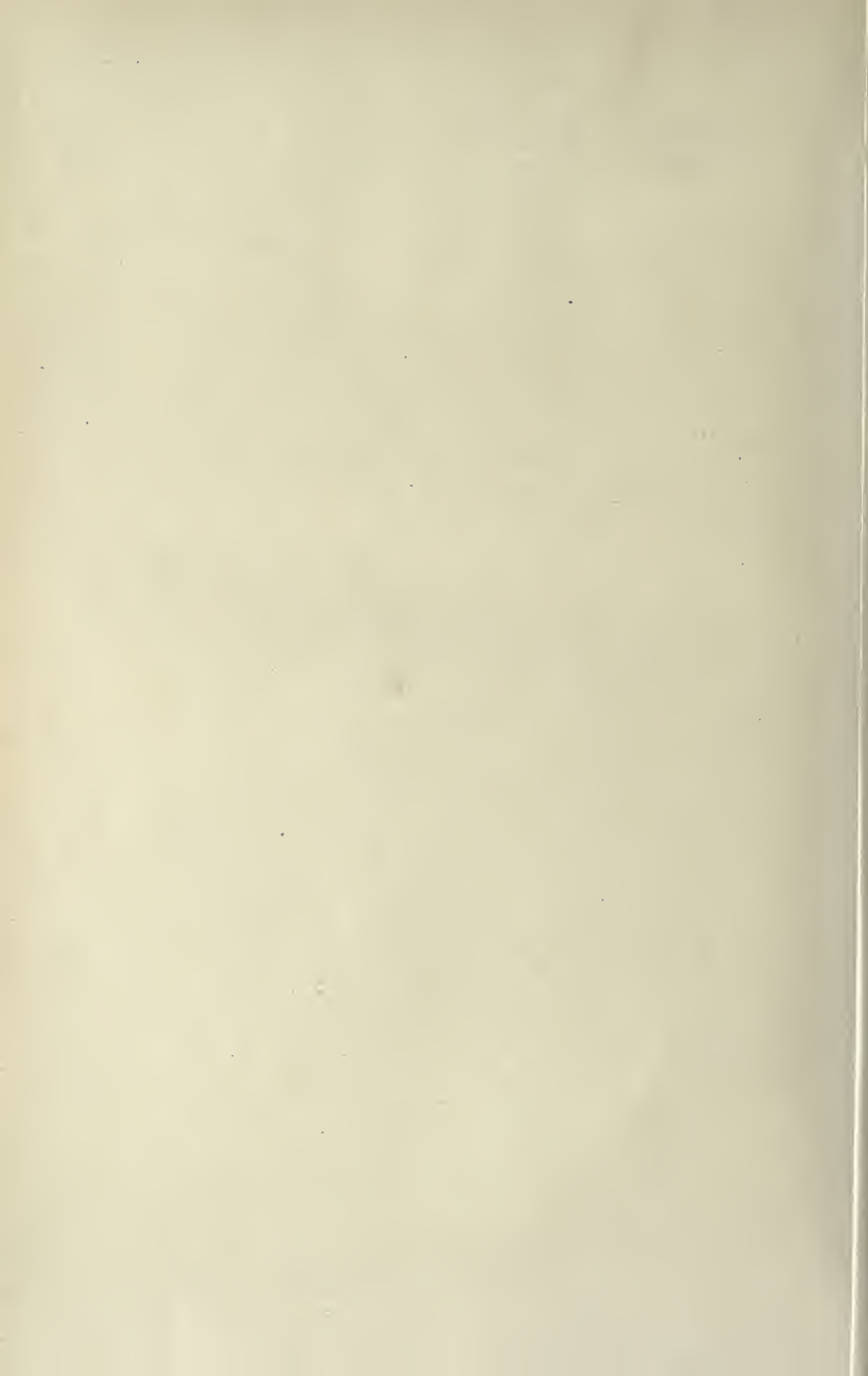
Pl. XXVI



G. O. Sars del.

*Macrocypris minna* (Baird)



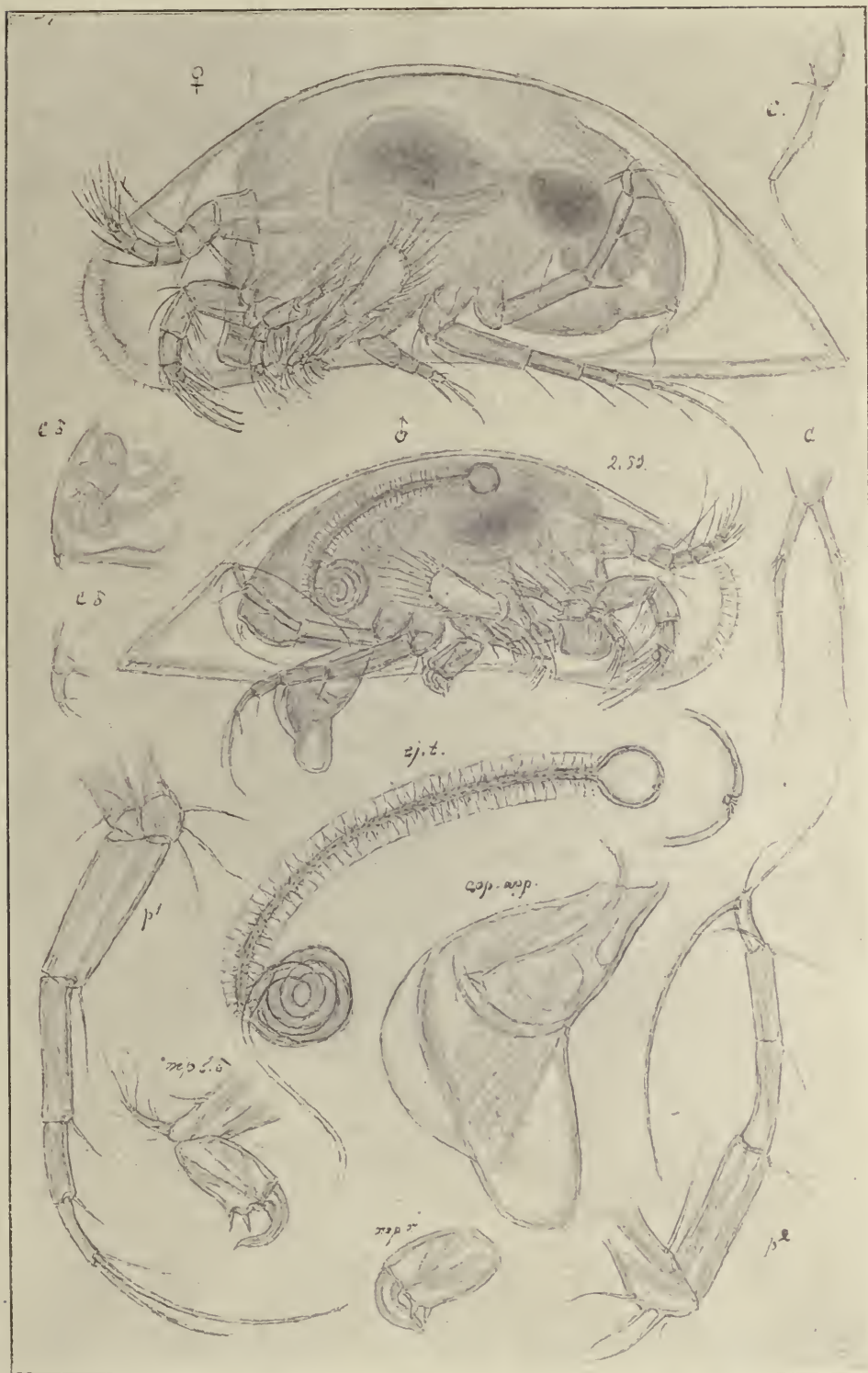


# Ostracoda

Cypridæ

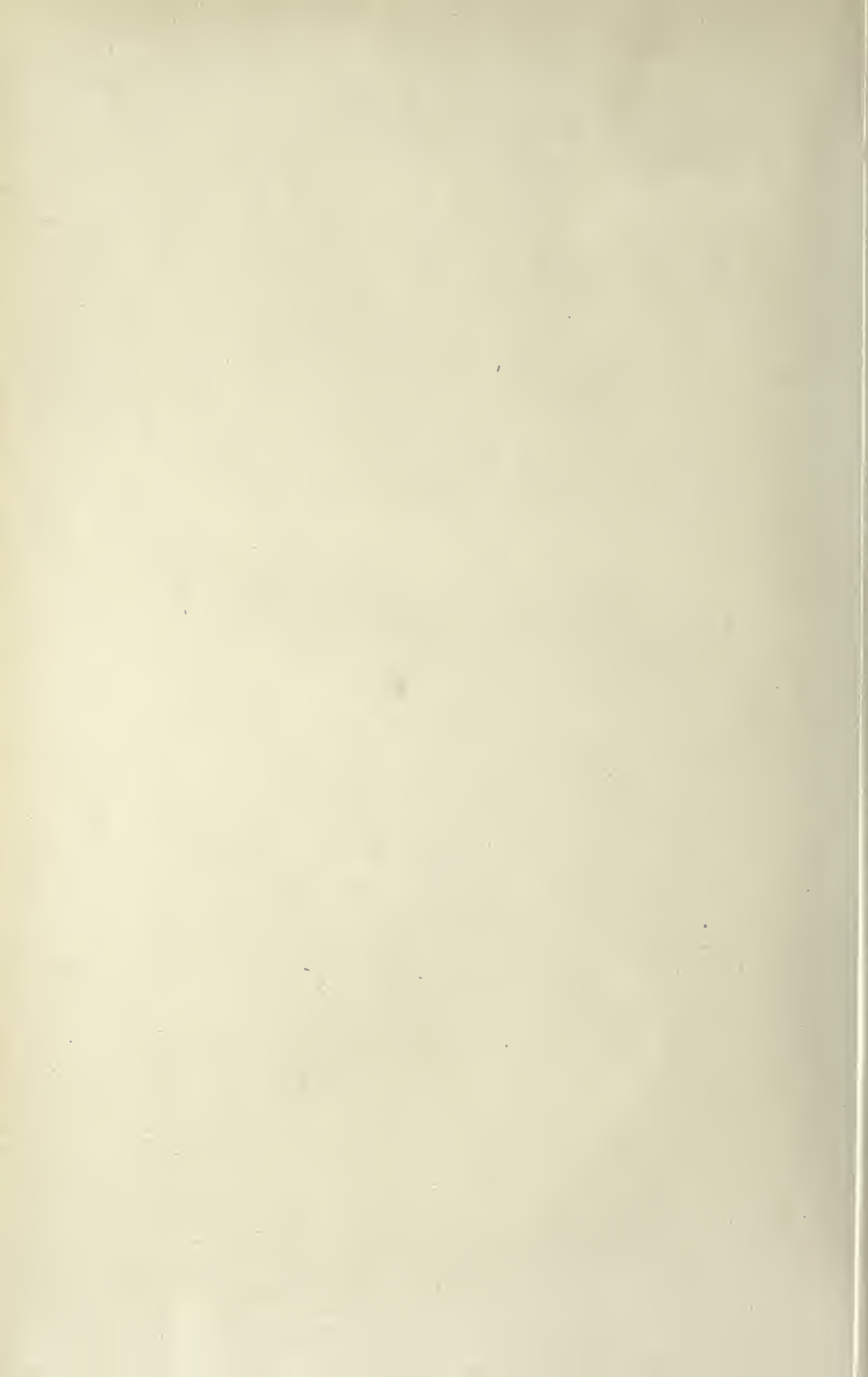
Podocopa

Pl. XXVII



G. O. Sars del.

*Macrocypris minna* (Baird)  
(continued)



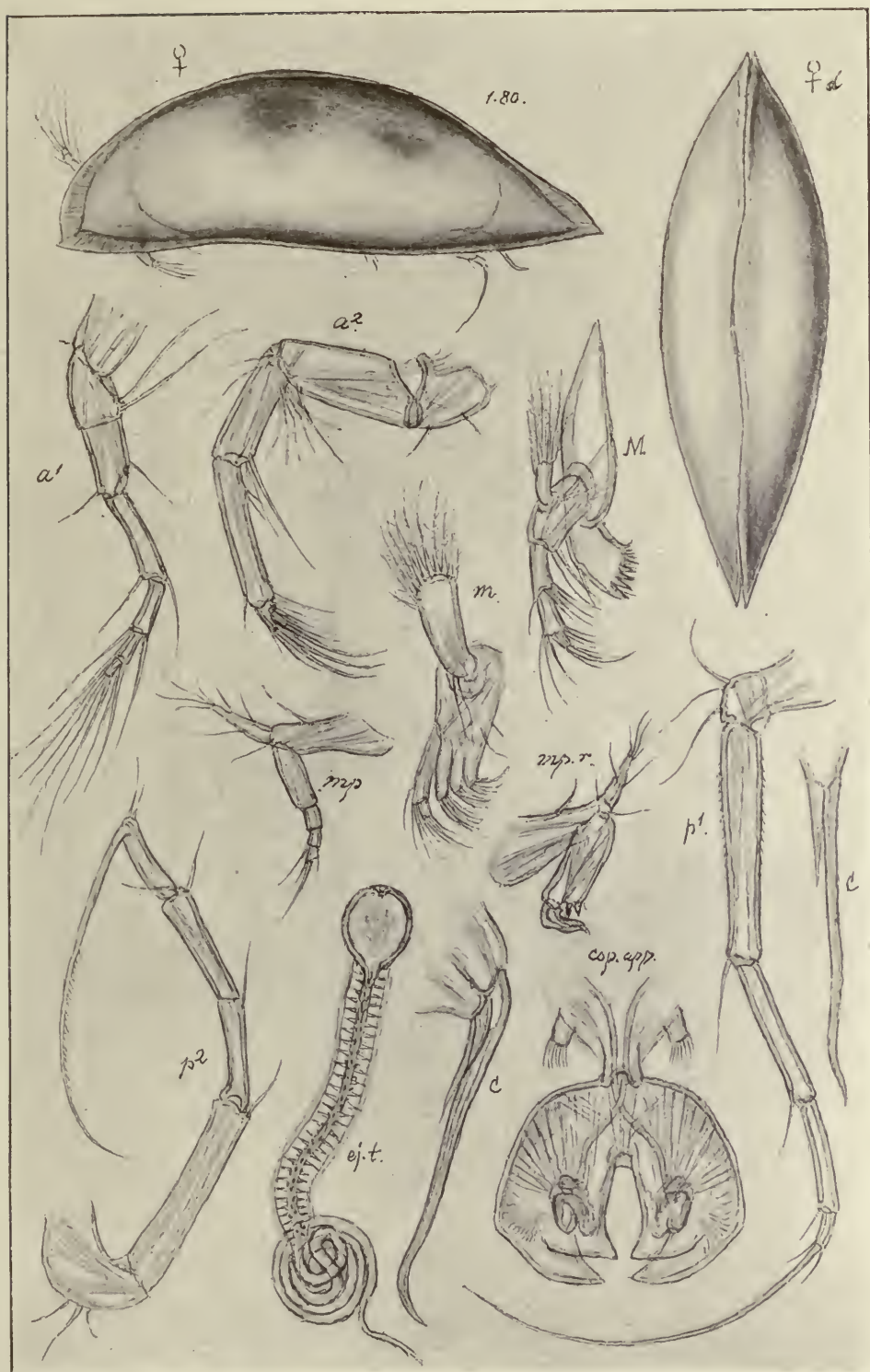


# Ostracoda

Cypridæ

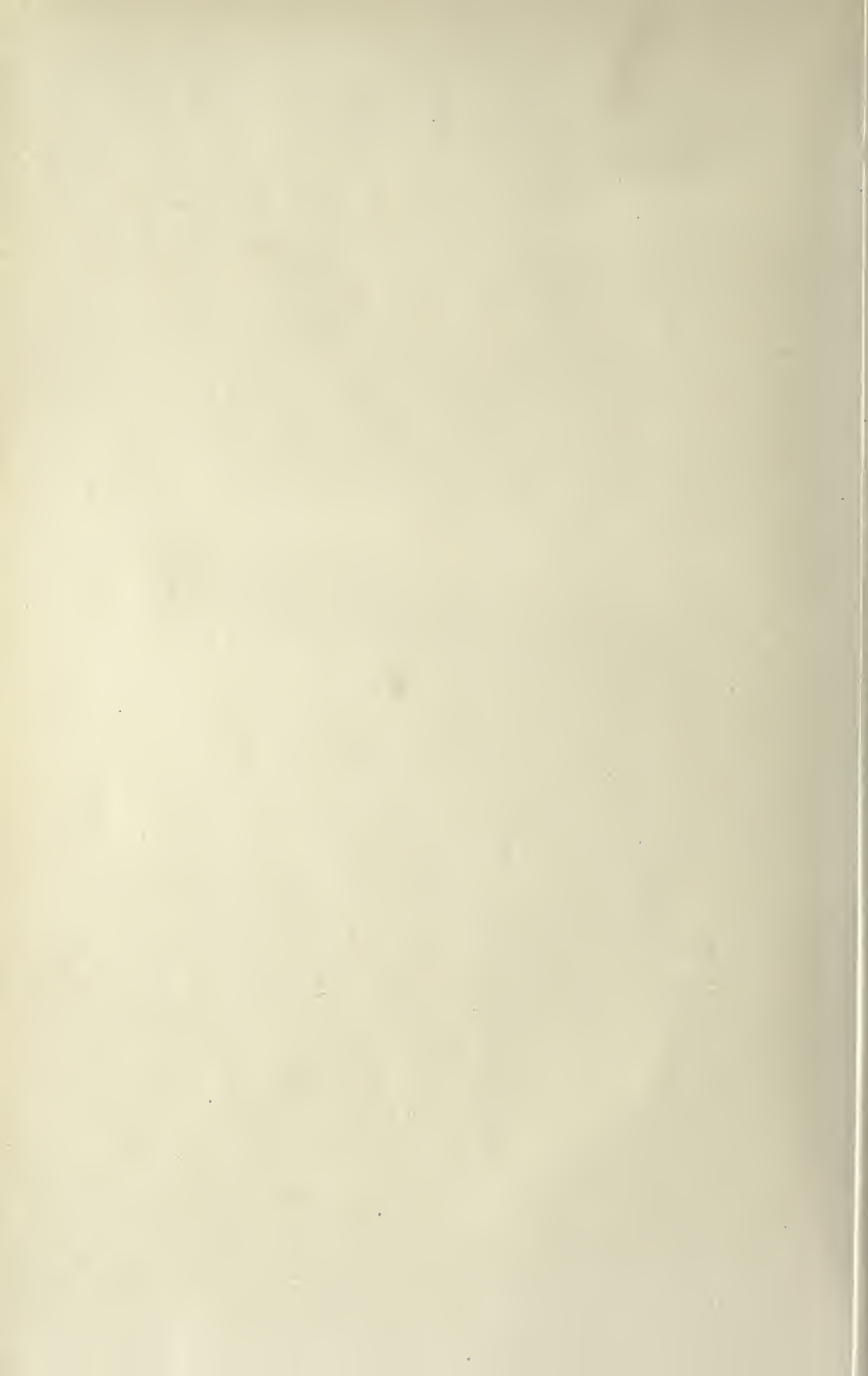
Podocopa

Pl. XXVIII



G. O. Sars del.

*Macrocypria angusta*, G. O. Sars

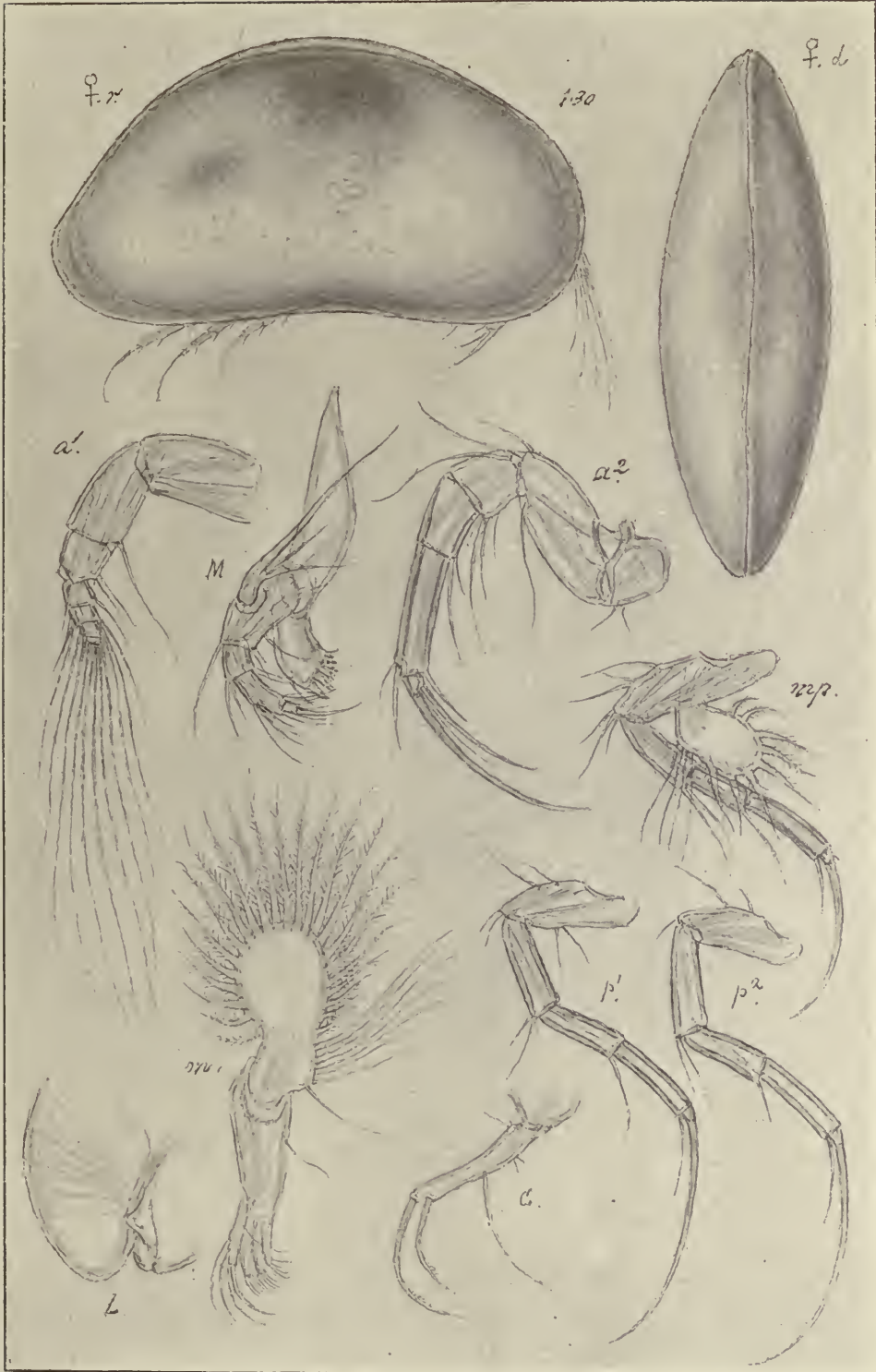


# Ostracoda

Cypridæ

Podocopa

Pl. XXIX



G. O. Sars del.

*Bythocypris bosquetiana*, Brady



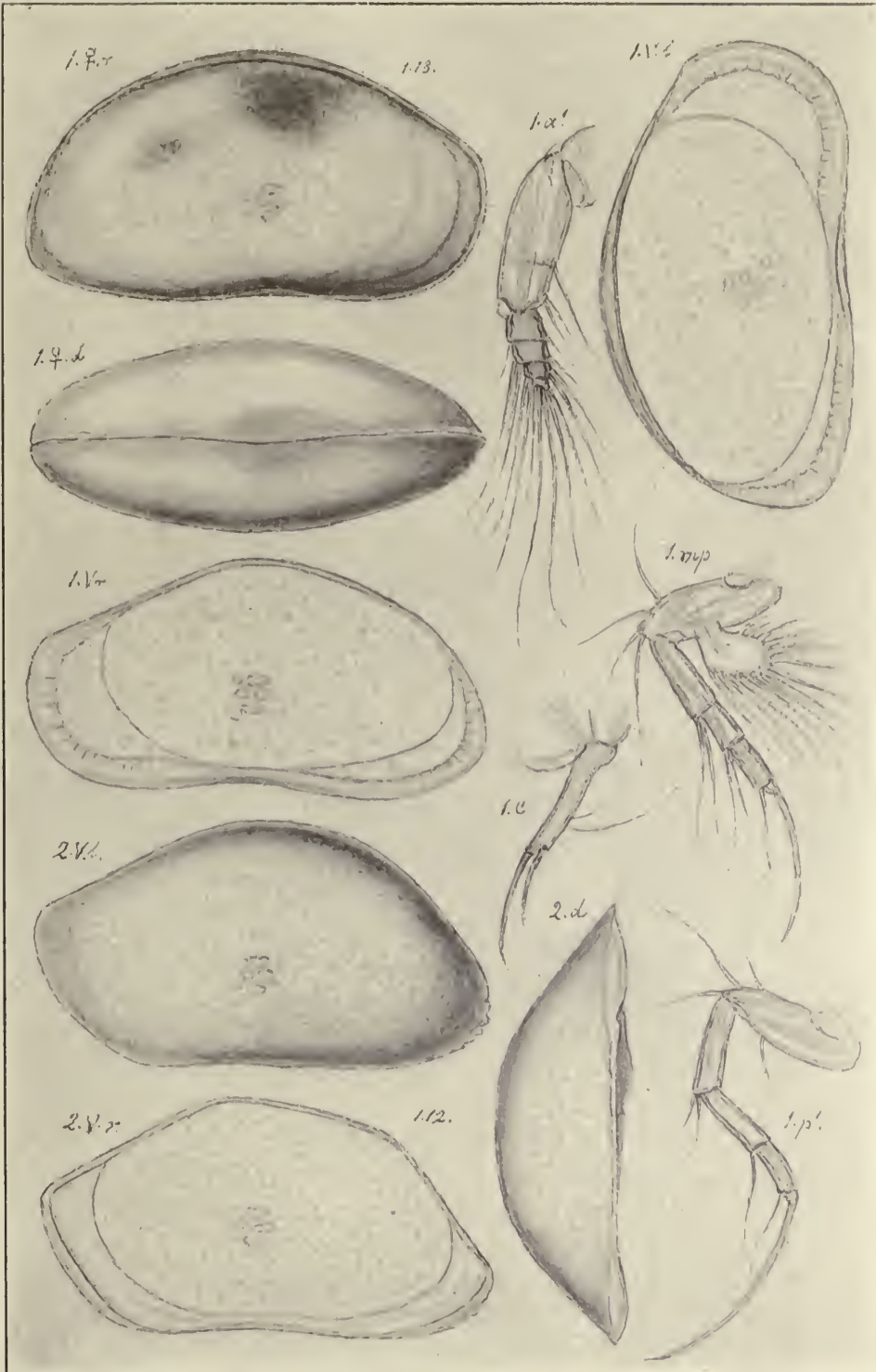


# Ostracoda

Cypridæ

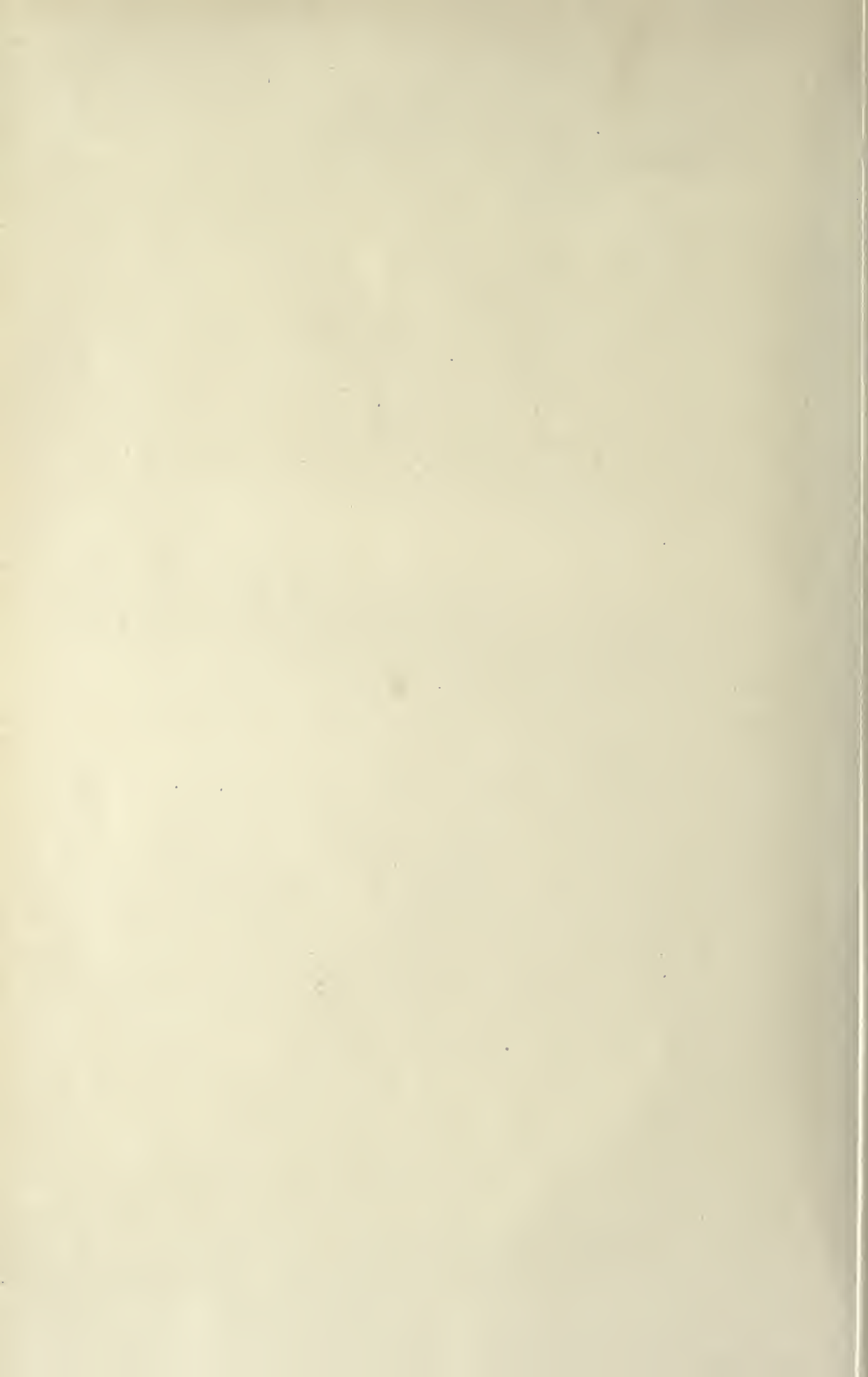
Podocopa

Pl. XXX



G. O. Sars del.

1. *Bythocypris obtusata*, G. O. Sars
2. *Bairdia inflata* (Norman)

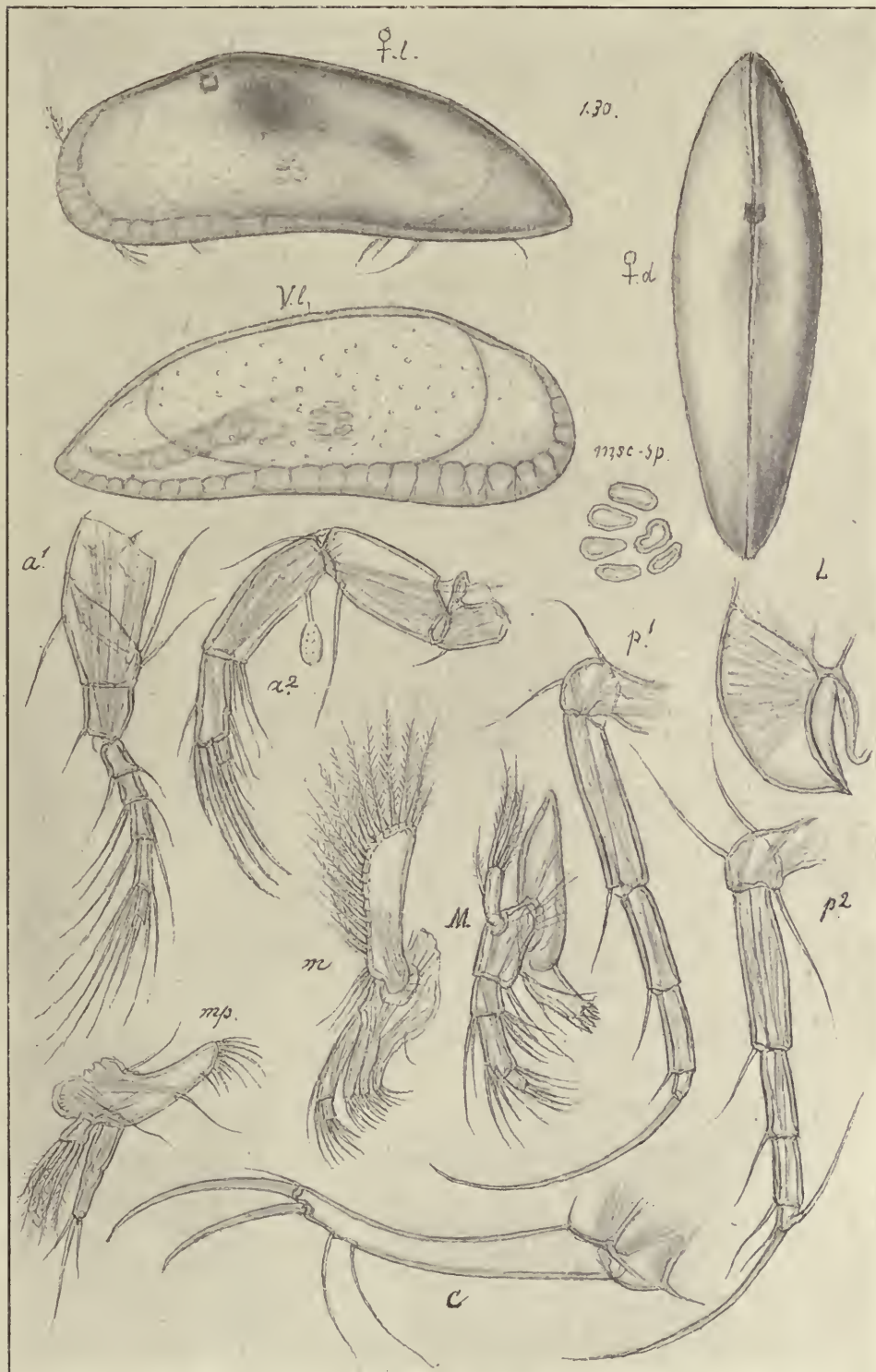


# Ostracoda

Cypridæ

Podocopa

Pl. XXXI



G. O. Sars del.

*Paracypris polita*, G. O. Sars



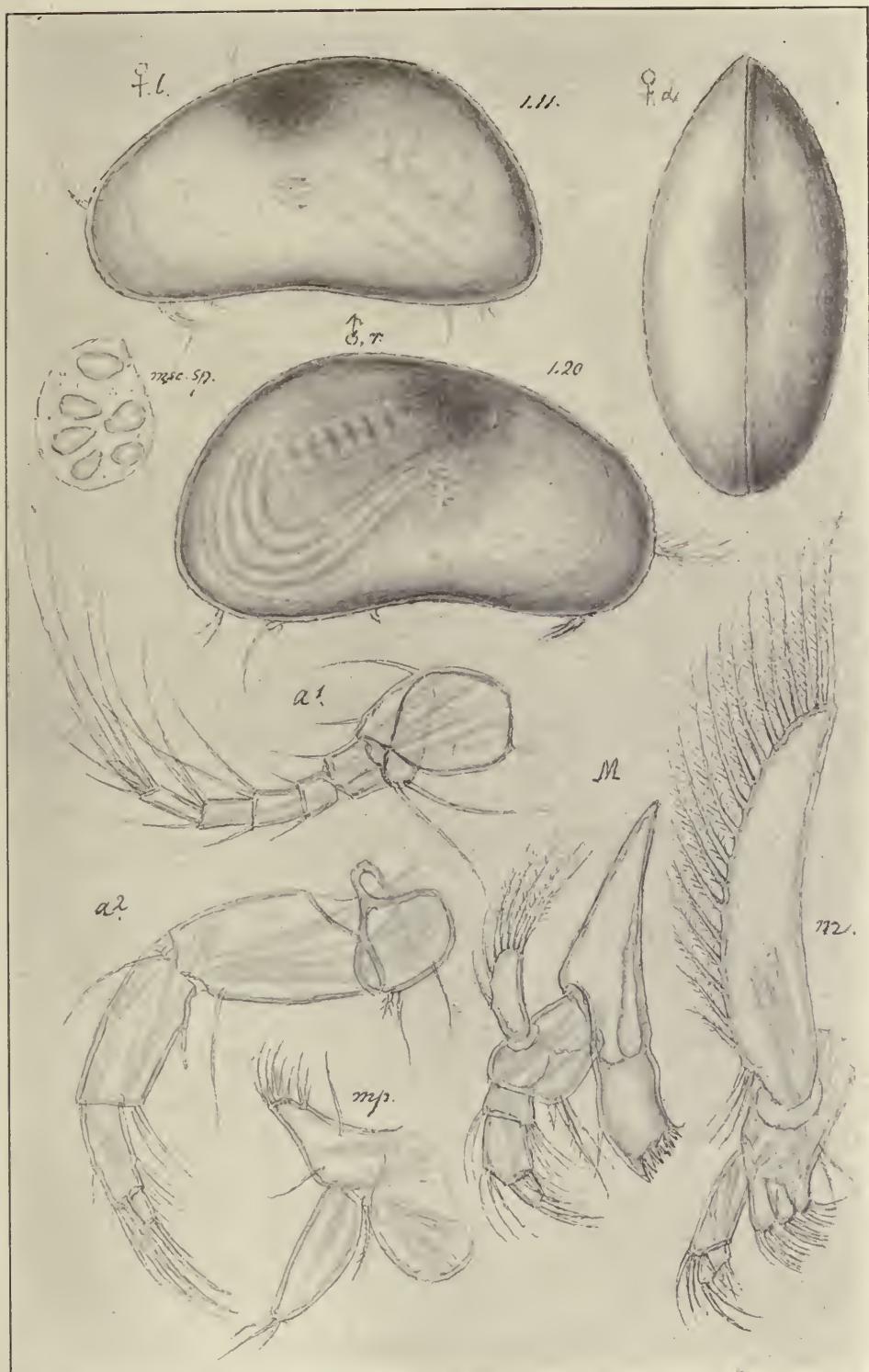


# Ostracoda

Cypridæ

## Podocopa

Pl. XXXII



G. O. Sars del.

*Candona candida* (O. Fr. Müller)



Length of female amounting to 1.10 mm.; of male to 1.13 mm.

*Remarks.*—As some of the species distinguished in recent times bear a very close resemblance to the one here in question, it is very likely to believe, that a confusion of these forms with *C. candida* has formerly taken place. Indeed it clearly appears from the several figures given in the most recent paper published by Brady and Norman in 1889, that at least 3 different species have been confounded and only regarded as simple varieties of *C. candida*. The statements uttered by some other authors on the great variability of the present species seem also to point to a similar confusion. I have myself examined a great number of specimens of this species from many different localities, without having been aware of any obvious variability in the shape of the shell in fully grown animals. In the immature state, it is true, the shape of the shell may look somewhat different from that in adult specimens; but this is also the case with most other species, and cannot of course be designed as variability of the species.

*Occurrence.*—This Ostracod seems to be of very common occurrence over the whole of our country, being found both in lakes and in small ponds and ditches. Besides in many other places, I have taken it very abundantly in our largest lake, Mjøsen, at Hamar, at a few fathoms depth, on a muddy bottom overgrown with aquatic plants. The animal is rather sluggish in habits, crawling slowly over the bottom, and often burrying more or less deeply within the loose mud and detritus. Yet, it may easily be detected, owing to its shining white colour. Male specimens of this species seem to have been very seldom met with. I have however found several such specimens in the gatherings taken at the above-named locality in Mjøsen.

*Distribution.*—Throughout Europe, Central Asia, Siberia, North America.

*Fossil* in postglacial deposits of Sweden.

#### 14. *Candona neglecta*, G. O. Sars.

(Pl. XXXIV, fig. 1).

*Candona neglecta*, G. O. Sars, Ostracoda mediterranea, Arch. f. Math. & Naturv. 1887, p. 107, Pl. XV, figs. 5—7, Pl. XIX.

Syn: *Candona candida*, Lilljeborg.

“ “ var. Brady & Norman.

“ *fabæformis*, Vávra (not Fischer)

*Specific Characters.*—*Female.* Shell conspicuously more elongate than in *C. candida*, seen laterally, oblong reniform in shape, greatest height behind and scarcely attaining half the length, dorsal margin almost straight in the



middle, with a slight angular bend in the ocular region, and sloping rather abruptly behind, ventral margin distinctly sinuated, anterior extremity rounded, posterior obliquely deflexed, with the infero-posteal corner somewhat prominent, though evenly rounded off at the end;—seen dorsally, narrow oblong in outline, with the greatest width not nearly attaining half the length. Surface of valves smooth and shining, though exhibiting a number of well marked scattered pits, and clothed at each extremity with short and delicate hairs. Posterior legs conspicuously more slender than in the type species, and having the penultimate joint distinctly subdivided in the middle. Caudal rami rather slender and attenuated and slightly curved, apical claws comparatively shorter than in *C. candida*, the distal one not nearly attaining half the length of the ramus, dorsal seta rather small and more approximate to the end. Genital lobes of rather inferior size, but distinctly angulated behind.

*Male* somewhat larger than female, and differing from it conspicuously in the shape of the shell, the posterior part of which is broadly rounded off and peculiarly expanded below, ventral sinus of the shell being moreover considerably deeper. Prehensile palps of maxillipeds comparatively shorter and stouter than in the preceding species, with the dactylar part less produced. Caudal rami perfectly straight and still more narrowly exerted than in female. Copulative appendages resembling in structure those in *C. candida*, though having the upturned lappet comparatively larger and subcordiform in shape.

Shell in both sexes of the usual pure white colour, and somewhat less opaque in male than in female.

Length of female amounting to 1.30 mm. of male to 1.40 mm.

*Remarks.*—This form was first described as a distinct species by the present author in the year 1887 from specimens taken in the Garda lake, upper Italy. It was however not recognised by subsequent authors, Brady & Norman having confounded it with *C. candida*, and Vávra with *C. fabæformis*. It is however evidently specifically distinct from either of these species, as admitted by all recent authors. The form recorded by Lilljeborg as early as the year 1853 under the name of *C. candida* is quite certainly not that species, but is more properly referable to the form here under question.

*Occurrence.*—The present species, it is true, has not yet been found within the limits of Norway. As it however occurs in the immediately adjacent tracts of Sweden, it is very likely to believe that, on a closer investigation, it will be met with in one or other place of the south eastern part of our country. The figures here given are drawn from specimens raised in my aquaria ut of dried mud from Algeria.

*Distribution*.—Sweden (Ekman), British Isles (Brady), Germany (G. W. Müller), Bohemia (Vavra), Switzerland (Kaufmann), Italy (G. O. Sars), Algeria (G. O. Sars).

15. *Candona lapponica*, Ekman.

(Pl. XXXIV, fig. 2).

*Candona lapponica*, Ekman, Ostracoden aus den nordschwedischen Hochgebirgen. Unters. Sarekgebirg. Vol. 4, p. 183, fig. 4.

*Specific Characters*.—*Female*. Shell, seen laterally, oblong subreniform in outline, greatest height behind and scarcely attaining half the length, dorsal margin somewhat arched in the middle and sloping rather steeply behind, more slowly in front, ventral margin slightly sinuated, anterior extremity evenly rounded, posterior obliquely deflexed, and terminating below in a narrowly rounded corner;—seen dorsally, elliptical in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length, both extremities pointed. Surface of valves smooth, glabrous, and clothed at each extremity with fine hairs. Posterior legs with the penultimate joint distinctly subdivided. Caudal rami resembling in shape those in *C. neglecta*, though somewhat less attenuated, distal claw exceeding half the length of the ramus; dorsal seta rather small. Genital lobes produced behind to a rather prominent triangular lappet.

Colour opaque white, with the usual pearly lustre.

Length of adult female scarcely exceeding 0.80 mm.

*Male* unknown.

*Remarks*.—Though the shape of the shell, as seen laterally, does not fully agree with the outline figure given by Ekman, I think I am right in identifying the above-described form with that recorded by the said author, as I have not found any other difference either in the size or in the structural details. It is one of the smallest species of the present genus.

*Occurrence*.—3 female specimens only of this form have as yet come under my notice, all exactly alike and evidently fully grown, as proved by the well developed ova shining through the semipellucid shell. They were found in a shallow ditch, at some distance from Christiania.

*Distribution*.—Swedish Lapmark (Ekman).

16. *Candona caudata*, Kaufmann.

(Pl. XXXV).

*Candona caudata*, Kaufmann, Cypriden und Darwinuliden der Schweiz, p. 365, Pl. 24, figs. 16—20, Pl. 26, figs. 17—23.Syn: *Candona acuminata*, Brady & Norm. (not Fischer)., — *elongata*, G. W. Müller.

*Specific Characters.—Female.* Shell rather elongate, seen laterally, narrow reniform in shape, with the greatest height not nearly attaining half the length, dorsal margin gently arched, without forming any distinct angular bend either in front or behind, ventral margin distinctly sinuated, anterior extremity evenly rounded, posterior obliquely produced and exerted to a rather prominent peculiarly deflexed corner more fully developed on the left valve, this corner being however quite obsolete in immature specimens; — seen dorsally, narrow elliptical in outline, with the greatest width only slightly exceeding  $\frac{1}{3}$  of the length, both extremities obtusely pointed. Surface of valves smooth and polished, though exhibiting a number of small scattered pittings and a few short and delicate hairs at each extremity. Both pairs of antennæ unusually robust, the anterior ones with the terminal part scarcely longer than the basal one, and having the setæ very coarse, almost spiniform. Anterior legs likewise comparatively more strongly built than in most other species, with the apical claw very coarse. Posterior legs with the penultimate joint distinctly subdivided. Caudal rami comparatively large, gradually attenuated, and only slightly curved, distal claw not attaining half the length of the ramus, dorsal seta of moderate size. Posterior end of body produced, immediately above the insertion of the caudal rami, to a slightly denticulated deflexed point, and carrying farther above a short seta. Genital lobes forming behind a rather prominent conical lappet.

Colour white, with a pearly lustre especially very conspicuous in young specimens.

Length of adult female amounting to 1.20 mm.

*Male* unknown.

*Remarks.*—This form was formerly identified by Brady and also by myself with *C. acuminata* (Fischer), which however, as shown by G. W. Müller, is a different species. It has been recorded by the latter author under the name of *C. elongata* Herrick; but the description and figures given by Herrick are much too imperfect as to allow of a certain identification, and I therefore agree with Dr. Alm in retaining for this species the name proposed by Kaufmann, who has given a good description and easily recognisable figures of it, the specific name alluding to the peculiarly exerted posterior corner of the shell.



This latter character, however, is only to be observed in fully grown specimens; in the immature state of the animal, scarcely any trace of such a corner is seen, the posterior extremity of the shell being quite evenly rounded off, as seen from the figure given on the accompanying plate. Such young specimens resemble closely in shape the form recorded by Brady in his Monograph under the name of *C. detecta* (O. Fr. Müller), which indeed may prove to be identical with the present species.

*Occurrence.*—I have taken this form rather abundantly in the Østensjø lake near Christiania at a depth of 2 or 3 fathoms on a muddy bottom. At first only immature specimens were met with; but somewhat later in the summer fully adult animals, with the characteristic produced posterior corner of the shell, were captured, and such specimens were also found in another locality, viz., in the Frogner dam located within the limits of the town. Only female specimens of this species have as yet been observed.

*Distribution.*—Sweden (Alm), British Isles (Brady), Germany (G. W. Müller), Switzerland (Kaufmann).

### 17. *Candona Sarsi*, Hartwig.

(Pl. XXXVI).

*Candona Sarsi*, Hartwig, Zool. Anzeiger, Vol. XXII, 1899, p. 544.

Syn: *Candona pubescens*, G. O. Sars (not Koch).

— *dentata*, G. W. Müller.

*Specific Characters.*—*Female.* Shell comparatively short and stout, seen laterally, irregularly oval or somewhat subreniform in shape, with the greatest height far behind and considerably exceeding half the length, dorsal margin, nearly straight in the middle and somewhat ascending behind, then bent downwards with a bold and quite even curve, ventral margin distinctly sinuated, anterior extremity somewhat obliquely rounded, posterior much broader and obtusely blunted, infero-posteal corner not at all exerted and broadly rounded off;—seen dorsally, oblong oval in outline, with the greatest width somewhat exceeding  $\frac{1}{3}$  of the length, anterior extremity more pointed than the posterior. Surface of valves of a somewhat dull appearance, being densely granular and all over clothed with unusually long and coarse hairs, giving this form a more hirsute aspect than in most other species; hyaline borders in front and behind very narrow. Both pairs of antennæ much more slender than in *C. caudata*. Posterior legs with the penultimate joint distinctly subdivided, the shortest of the apical setæ very small and hamiform curved. Caudal rami comparatively short and stout, perfectly straight and somewhat tapering distally, apical claws



distinctly denticulated and only curved in their outer part, the longer claw considerably exceeding half the length of the ramus, dorsal seta of moderate size. Genital lobes simply rounded off behind.

*Male* of about same size as female, but slightly differing in the shape of the shell, the posterior part of which is comparatively higher and more broadly rounded off. Posterior antennæ exhibiting the usual well-marked subdivision of the penultimate joint and the characteristic sensory spines at the junction of the 2 joints. Prehensile palps of the maxillipeds somewhat unequal, the right one being conspicuously broader than the left and angularly bent at the end; dactylar part of both palps terminating in a sharp point. Copulative appendages provided behind with 2 well defined thin lobes of nearly equal size, the upper one somewhat securiform in shape, the lower broadly rounded.

Colour in both sexes opaque white.

Length of adult female amounting to 1.25 mm.

*Remarks.*—This form was described in the year 1890 by the present author, and was at that time identified with *Cypris pubescens* of Koch. Subsequently however Hartwig found the true Kochian species, and stated its difference from the present species, which he proposed to rename as above. Yet, Dr. Kaufmann, though admitting the specific difference of the 2 forms, has found it permissible to employ for the present species the Kochian denomination with only the necessary change of the authors name, as he is of opinion, that the form recorded by Koch does not at all belong to *Candona*, but to a particular genus, *Pseudocandona*. The validity of this new genus seems however to me to be very questionable, the only difference from *Candona* being the supposed want of a subdivision of the penultimate joint of the posterior antennæ in the male. In any case the name *pubescens* cannot in my opinion be employed to both these species, but must evidently be restricted to that originally recorded by Koch.

*Occurrence.*—The only place where I have met with this form is in a small waterhole in the immediate neighbourhood of Christiania, from which several specimens, males and females, were collected, many years ago, and late in the autumn. This water-hole is now filled up and, like many others of my best finding-places, destroyed by new-building.

*Distribution.*—British Isles (Brady), Switzerland (Kaufmann).

18. *Candona rostrata*, Brady & Norman.

(Pl. XXXVII).

*Candona rostrata*, Brady & Norman, Monograph of the marine and fresh-water Ostracoda of the North western Europe, 1889, p. 101, Pl. IX, figs. 11 & 12, Pl. XII, figs. 22—31.

Syn: *Candona limbata*. G. O. Sars

„ „ *marchica*, G. W. Müller (part)

*Specific Characters.*—*Female*. Shell somewhat compressed, seen laterally, angularly subreniform in outline, greatest height far behind and only slightly exceeding half the length, dorsal margin straight in the middle and somewhat ascending, with a slight trace of angle both in front and behind, ventral margin rather deeply sinuated, anterior extremity bluntly rounded or almost transversely truncated, posterior much higher and broadly rounded off, forming below a rather conspicuous bowed expansion;—seen dorsally, oblong oval in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length, anterior extremity remarkably contracted at the end, forming, as it were, a sharp rostriform prominence, posterior obtusely pointed. Valves somewhat unequal, the left one overlapping the right slightly both in front and behind, hyaline borders at each extremity very broad and conspicuous, surface of a somewhat dull appearance and all over densely hairy, the hairs being however less coarse than in the preceding species. Antennæ moderately slender, resembling in structure those in that species. Posterior legs likewise of a very similar appearance. Caudal rami somewhat more attenuated, with the apical claws comparatively shorter. Genital lobes simply rounded behind.

*Male*, as a rule, somewhat larger than female, and having the posterior part of the shell rather more expanded. Prehensile palps of maxillipeds conspicuously unequal, the right one being much broader than the left and considerably bowed outside. Caudal rami still more attenuated than in female, with the apical claws less curved. Copulative appendages resembling in structure those in *C. Sarsi*, but having the upper terminal lappet smaller and simply rounded.

Colour in both sexes whitish, semipellucid, with a more or less distinct orange tinge.

Length of adult female amounting to 1.10 mm., of male to 1.20 mm.

*Remarks.*—This form was described in the year 1889 by Brady and Norman from some male specimens, the female sex not being observed. It is evidently nearly allied to the preceding species, but may readily be distinguished by the somewhat different shape of the shell and its less coarse hairy clothing, as also by the very broad and conspicuous hyaline borders at each extremity.

In allusion to this latter character I had long ago noted this form under the provisional name *C. limbata*. Another peculiar character distinguishing the present species is the abrupt contraction of the anterior extremity of the shell which, in the dorsal or ventral aspect of the animal, looks like a sharply pointed rostrum; hence the specific name proposed.

*Occurrence*.—I have met with this form occasionally in the environs of Christiania, especially in shallow grassy creeks at the borders of lakes and formed by the higher level of the water in the lakes during the spring. Unlike what is generally the case, male specimens of this form are more frequently met with than females.

*Distribution*.—Sweden (Ekman), British Isles (Brady) Germany (G. W. Müller), Bohemia (Vávra), Russia (Cronenberg).

### 19. *Candona marchica*, Hartwig.

(Pl. XXXVIII, fig. 1).

*Gandona marchica*, Hartwig, Sitzungs Berichte de Gesellsch. naturf. Freunde in Berlin 1899, Nr. 8, p. 183.

Syn: *Candona rostrata*, G. W. Müller (part).

*Specific Characters*.—*Female*. Shell comparatively shorter and stouter than in *C. rostrata*, though, seen laterally, of a somewhat similar shape, greatest height as usual behind and considerably exceeding half the length, dorsal margin somewhat ascending and joining the posterior edge by a bold and quite even curve, ventral margin slightly sinuated, anterior extremity more uniformly rounded than in *C. rostrata*, posterior blunted and less expanded below; seen dorsally, oblong oval in outline, with the greatest width somewhat exceeding  $\frac{2}{5}$  of the length, anterior extremity more pointed than the posterior, but scarcely rostriform produced. Surface of shell, as in the preceding species, densely hairy, hyaline borders however rather narrower. Structure of the several limbs almost exactly as in *C. rostrata*. Caudal rami comparatively shorter and stouter than in that species, with the apical claws more unequal in length, the proximal one being very much shorter than the distal one, which almost attains the entire length of the ramus. Genital lobes broadly rounded off behind.

*Male* of somewhat larger size than female and rather like the male of *C. rostrata* in the shape of the shell, though having the hyaline borders in front and behind conspicuously narrower. Prehensile palps of maxillipeds comparatively shorter and stouter. Caudal rami with the proximal claw much



reduced in size, being scarcely half as long as the distal one and almost perfectly straight. Copulative appendages comparatively smaller than in *C. rostrata* and slightly differing in shape, lower terminal lappet somewhat bilobed at the end.

Colour whitish, semipellucid, with a faint yellow tinge.

Length of adult female scarcely exceeding 0.92 mm.; that of male about 1 mm.

*Remarks.*—The present form is closely allied to *C. rostrata*, and seems indeed often to have been confounded with that species. It is however rather inferior in size, and has the shell, at least in female, conspicuously shorter and stouter. Dr. Hartwig has moreover called attention to an easily observable difference in the structure of the caudal rami in both sexes.

*Occurrence.*—I have found this form not unfrequently in similar localities to those in which *C. rostrata* occurs, but only in the early part of the summer.

*Distribution.*—Sweden (Ekman), Germany (Hartwig), Switzerland (Kaufmann).

## 20. *Candona stagnalis*, G. O. Sars.

(Pl. XXXVIII, fig. 2).

*Candona stagnalis*, G. O. Sars, Oversigt af Norges Crustaceer II, p. 65.

Syn: *Candona Zenkeri*, G. O. Sars.

" — *rara*, G. W. Müller.

" — *quadrata*, Alm.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong subreniform in shape, greatest height behind and scarcely exceeding half the length, dorsal margin straight and nearly horizontal, joining the posterior edge by an abrupt, almost angular bend, ventral margin distinctly sinuated, anterior extremity obliquely rounded, posterior much broader and obtusely blunted, forming below a rather conspicuous bowed expansion;—seen dorsally, narrow oblong in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length, both extremities obtusely pointed. Surface of valves smooth, without any obvious sculpture, and clothed at each extremity with comparatively short and fine hairs, posterior expansions flanked by a rather broad pellucid border. Posterior legs with the penultimate joint not subdivided, shortest apical seta about the length of the terminal joint and not hamiform curved. Caudal rami comparatively slender and attenuated, almost straight, apical claws of moderate size and not much unequal, the distal one scarcely exceeding half the length of the ramus, dorsal seta small and attached not far from the end. Genital lobes of unusual size, subquadrate in shape and forming behind an angular corner.



*Male* of about same size as female, but having the posterior part of the shell more broadly rounded off. Prehensile palps of maxillipeds resembling in structure those in *C. marchica*. Caudal rami about as in female. Copulative appendages with 3 well defined terminal lappets of nearly equal size, though somewhat differing in shape.

Colour whitish, with a faint yellow tinge.

Length of adult female amounting to 0.86 mm.

*Remarks.*—The above-described form was shortly characterised by the present author in the year 1899; but the structural details were not sufficiently made out, for which cause the species was not recognised by subsequent authors, it having been recorded as new under 2 different names, viz., as *C. rara* by G. W. Müller and as *C. quadrata* by Alm. The latter author has however in his most recent treatise admitted the identity of these 2 forms with the Norwegian species. The form recorded by me under the name of *C. Zenkeri* I am now disposed to consider as only a variety of the present species.

*Occurrence.*—I found this form, many years ago, rather abundantly in some small ditches located in the immediate neighbourhood of Christiania. These ditches are now destroyed by new-building; but I had fortunately secured a sufficient preserved material for a renewed examination, and have thus been enabled to confirm the statement given by Dr. Alm about the remarkable size and peculiar shape of the genital lobes in the female.

*Distribution.*—Sweden (Ekman), British Isles (Brady), Germany (C. W. Müller).

## 21. *Candona albicans*, Brady.

(Pl. XXXIX, fig. 1).

*Candona albicans*, Brady, Monograph of recent British Ostracoda, p. 381, Pl. XXV, figs. 20—25).

Syn: *Candona parallela*, G. W. Müller.

*Specific Characters.*—*Female.* Shell, seen laterally, oval subreniform in shape, only slightly higher behind than in front, greatest height somewhat exceeding half the length, dorsal margin perfectly straight and nearly horizontal, with a faint indication to an angle both in front and behind, ventral margin only very slightly sinuated, anterior extremity obliquely rounded, posterior obtusely blunted and scarcely expanded below;—seen dorsally, oblong oval or elliptical in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length and both extremities obtusely pointed. Valves only slightly pellucid and clothed at each extremity with short and delicate hairs, surface of a dull appearance,

exhibiting numerous densely crowded areolæ or pits, especially very sharply marked in young specimens. Posterior legs with the penultimate joint distinctly subdivided, shortest apical seta not hamiform and nearly twice the length of the terminal joint. Caudal rami resembling in shape those in *C. stagnalis*, though perhaps a little shorter. Genital lobes of moderate size and simply rounded, not forming any projecting corner behind.

*Male* of about same size as female and only slightly differing from it in the shape of the shell. Prehensile palps of maxillipeds and copulative appendages not essentially differing in structure from those parts in *C. stagnalis*.

*Remarks.*—I have felt justified in restoring the species originally established by Brady as *C. albicans*, although that author in his more recent publications has questioned its validity, supposing it to have been merely founded on immature specimens of an earlier known Candona, *C. compressa* (Koch). True, in very young specimens of this and also of some other Candonæ a slight areolation of the valves similar to that described by Brady in his *C. albicans*, may be traced; but in none of them this areolation is so strongly marked as in this species and very soon disappears wholly by the growth of the animal. In the present species, however, it is well observable also on the valves of fully adult specimens, though somewhat less conspicuous than in the immature state. I have compared young specimens of the present species with the description and figures given by Brady, and find the agreement quite complete, both as to the shape of the shell and to its sculpture. The *C. parallela* of G. W. Müller is unquestionably identical with Brady's species.

*Occurrence.*—This form is rather common in the environs of Christiania, being generally found in small ditches and pools with muddy bottom. During the early part of the summer, as a rule, only immature specimens are met with, but somewhat later, under favourable circumstances, also fully adult animals may be captured. Male specimens seem to be rather scarce. I have as yet only come across 2 such specimens, the one of which is figured on the accompanying plate.

*Distribution.*—Sweden (Alm), British Isles (Brady), Germany (G. W. Müller).

## 22. *Candona compressa*, (Koch).

(Pl. XXXIX, fig. 2).

*Cypris compressa*, Koch, Deutschlands Crustaceen, p. 171, Pl. 17.

Syn: *Candona pubescens*, Vávra (not Koch).

" --- *fallax*, G. W. Müller.

*Specific Characters.*—*Female.* Shell somewhat compressed, seen laterally, angularly subreniform in shape, much higher behind than in front, greatest



height slightly exceeding half the length, dorsal margin straight in the middle and conspicuously ascending behind, joining the posterior edge by an abrupt angular bend, ventral margin scarcely at all sinuated, anterior extremity narrowly rounded, posterior very broad and obliquely deflexed, with the lower corner evenly rounded off;—seen dorsally, narrow oblong in outline, with the greatest width scarcely exceeding  $\frac{2}{5}$  of the length, anterior extremity more pointed than the posterior. Valves rather densely hairy and having the hyaline borders in front and behind very narrow; surface in most cases apparently quite smooth, though in some specimens a very delicate and dense reticulate pattern may be traced over the whole of the shell. Posterior legs with the penultimate joint distinctly subdivided, shortest apical seta not hamiform and more than twice as long as the terminal joint. Caudal rami comparatively slender and attenuated, with the apical claws of moderate size and distinctly denticulate, the distal one scarcely attaining half the length of the ramus. Genital lobes of a rather peculiar and characteristic shape, being divided by a deep median sinus into 2 lanceolate lappets, the posterior one the larger.

*Male* somewhat smaller than female, but resembling it in the shape of shell. Prehensile palps of maxillipeds rather unequal, the right one being much broader than the left, with the outer edge considerably bulging. Copulative appendages differing somewhat in shape from those in the other species and exhibiting 2 sub-erect terminal lappets of rounded form. Ejaculatory tubes also somewhat deviating in structure, the central duct being unusually wide, whereas the radiating spikes are very short.

Colour opaque white.

Length of adult female amounting to 1.05 mm.

*Remarks.*—I am by no means assured, that the identification of this species by other authors has in every case been correct. Thus it appears to me quite evident, that the form so named by Ekman cannot be this species, as the female genital lobes are described and figured as quite simple, rounded off; nor seems the outline figure of the shell given by Dr. Alm to be in any full accord with the present species. Yet, it may be assumed as tolerably certain, that both the form recorded by Lilljeborg and that described and figured by Brady are in reality identical with the species here in question. By none of the authors I find any mention of the peculiar shape of the genitales lobes, as described above, though this character alone will suffice for distinguishing the present species from any of the other known Candonæ. As to the *C. fallax* of G. W. Müller, it has recently been mentioned by Dr. Alm as a synonym of *C. compressa*. Whether this is correct or not, I am unable at present to decide.

*Occurrence.*—The only place where I have as yet met with this species, is in a shallow muddy swamp located on the Fornebo peninsula, at some distance west of Christiania. Male and female specimens occurred here in about equal number.

*Distribution.*—Sweden (Lilljeborg), British Isles (Brady), ? Germany (G. W. Müller), Bohemia (Vávra).

## Gen. 10. *Cryptocandona*, Kaufmann, 1900.

*Generic Characters.* Shell thin and much compressed, with the valves nearly equal and having the inner duplicatures rather broad. Antennæ, mandibles and maxillæ about as in *Candona*. Maxillipeds however with the vibratory plate less rudimentary, carrying 3 well developed plumose setæ. Anterior legs rather slender. Posterior legs with 2 additional setæ inside, not found in *Candona*, the one attached in the middle of the penultimate joint, the other at the end of the preceding joint; apical setæ, as in *Candona*, 3 in number, but exhibiting a somewhat different mutual relation, the outermost seta being much longer than the other 2 and more abruptly reflexed. Caudal rami comparatively large, but with the dorsal seta extremely small, almost obsolete. Male specimens not yet observed of any of the species.

*Remarks.*—This genus proposed by Kaufmann is nearly allied to *Candona*, and has indeed not been admitted as such by the most recent author, Dr. Alm, who regards it to represent only a subsection or group of that genus. I think however that this genus ought to be supported, as it exhibits some well-marked differences from *Candona* found in all the species. As observed by Kaufmann, the genus shows in several respects an approach to the next genus, *Candonopsis*, occupying, as it were, an intermediate place between it and *Candona*. The male characters remain to be made out, and will no doubt present some peculiarities. 5 species referable to the present genus are as yet known, 2 of them being represented in the Fauna of Norway.

## 23. *Cryptocandona Vávrai*, Kaufmann.

Pl. XL, fig. 1).

*Cryptocandona Vávrai*, Kaufmann, *Cypriden und Darwinutiden der Schweiz*, p. 391, Pl. 24, figs. 12—15, Pl. 26, figs. 10—16.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong reniform in shape, only slightly higher behind than in front, greatest height about equal to half the length, dorsal margin straight in the middle and somewhat abruptly



bent both in front and behind, ventral margin distinctly sinuated, anterior extremity evenly rounded, posterior somewhat obliquely deflexed and rounded off below; — seen dorsally, narrow oblong in outline, with the side-edges almost straight in the middle, greatest width scarcely attaining  $\frac{1}{3}$  of the length, both extremities obtusely pointed. Valves smooth, glabrous, and clothed at each extremity with short and delicate hairs; inner duplicatures remarkably broad both in front and behind. Anterior antennæ with the terminal part scarcely as long as the basal one, and having the 4 first joints comparatively short, last joint however remarkably slender and narrow, being fully as long as the 2 preceding joints combined. Maxillipeds with the palp comparatively short and stout, bluntly rounded at the tip. Posterior legs with the penultimate joint not subdivided, shortest apical seta scarcely longer than the terminal joint and hamiform curved. Caudal rami perfectly straight and gradually tapered, apical claws moderately strong and slightly curved, the distal one scarcely exceeding half the length of the ramus. Genital lobes evenly rounded.

Shell semipellucid, of whitish or light grey colour.

Length of adult female 0.90 mm.

*Remarks.*—This form, being that described at the earliest date, ought of course to be regarded as the type of the present genus. It is readily recognised from any of the species of *Condon* by the very much compressed and rather regularly reniform shape of the shell.

*Occurrence.*—I have taken this form, many years ago, in a shallow ditch at some distance west of Christiania (Bogstad), and have more recently also met with it in another locality, viz., at Grimstad, south coast of Norway. All the specimens collected were of the female sex and fully grown.

*Distribution.*—Sweden (Ekman), Switzerland (Kaufmann).

## 24. *Cryptocandona reducta*, (Alm).

(Pl. XL, fig. 2.

*Condon reducta*, Alm, Monographie der Schwedischen Süsswasser Ostracoden, p. 137.

*Specific Characters.*—*Female.* Shell, seen laterally, narrow oblong in shape, scarcely higher behind than in front, greatest height in the middle and not nearly attaining half the length, dorsal margin well arched, without any abrupt bend either in front or behind, ventral margin only very slightly sinuated, anterior extremity evenly rounded, posterior somewhat exerted and obtusely blunted at the end; — seen dorsally, narrow lanceolate in outline, with the side-edges evenly curved and both extremities sharply pointed. Valves very

thin and pellucid and sparingly hairy at each extremity, surface quite smooth and polished, inner duplicatures less broad than in the preceding species. Anterior antennæ with the terminal part fully as long as the basal one, and having the last 2 joints rather elongated and subequal in size, setæ comparatively shorter than in the preceding species. Posterior legs with the penultimate joint distinctly subdivided, shortest of the apical setæ not hamiform. Caudal rami somewhat less strong than in the type species and slightly curved, apical claws rather thin, the distal one exceeding somewhat half the length of the ramus.

Colour transparent whitish.

Length of adult female amounting to 0.95 mm.

*Remarks*.—Though the outline-figures of the shell given by Dr. Alm. do not fully agree with those here drawn, I cannot doubt that the above-described form is identical with Alm's species, as otherwise no difference could be detected. The species is readily distinguishable from *C. Våvrai* by the very narrow and elongated shell, the shape of which, as seen laterally, exhibits a perplexing resemblance to that in *Candona anceps*, Ekman.

*Occurrence*.—Some few specimens of this pretty species were found in the same localities in which *C. Våvrai* occurred. I have moreover taken it occasionally in the Maridal lake near Christiania and in the Van lake near Moss at depths varying from 2 to 20 fathoms.

*Distribution*.—Sweden (Alm).

## Gen. 11. *Candonopsis*, Våvra, 1891.

*Generic Characters*.—Shell thin, compressed, more or less reniform in shape, with the inner duplicatures of the valves very broad in front. Both pair of antennæ, and particularly the anterior ones, very slender, but not adapted for swimming, the posterior ones in male with the penultimate joint subdivided, as in *Candona*. Mandibular palp unusually produced, with the terminal joint long and narrow. Maxillipeds with a well defined vibratory plate carrying 3 thickish plumose setæ, palp in female slender and attenuated, in male transformed in a similar manner to that in *Candona*. Posterior legs resembling in structure those in *Cryptocandona*, except that the seta inside the end of the penultimate joint is wanting. Caudal rami very slender and narrow, without any trace of a dorsal seta.

*Remarks*.—This genus was established in the year 1891 by Våvra, to include the form recorded by Brady and Robertson under the name of *Candona*

*Kingsleyi*, and has been admitted by all recent authors. Indeed, this genus exhibits some very conspicuous differences from the true *Candonæ* and appears to approach more nearly to *Crypocandona*, being however well distinguished also from that genus. It comprises only a single European species, but is represented in more southern latitudes by several nearly-allied forms.

## 25. *Candonopsis Kingsleyi* (Brady & Robertson).

(Pl. XLI).

*Candona Kingsleyi*, Brady & Robertson The Ostracoda and Foraminifera of Tidal Rivers. Ann. Mag. Nat. Hist. Vol. VI, ser. 4, p. 17, Pl. IX, figs. 9—12.

Syn: *Candona fabæformis* G. O. Sars (not Fischer).

*Specific Characters.*—*Female*. Shell, seen laterally, rather regularly reniform in shape, greatest height a little behind the middle and about equal to half the length, dorsal margin forming a quite even curve throughout, without any trace of an angular bend either in front or behind, ventral margin distinctly sinuated, both extremities evenly rounded off, the anterior a little broader than the posterior; — seen dorsally, narrow lanceolate in outline, with the greatest width behind the middle and about equal to  $\frac{1}{3}$  of the length, anterior extremity more pointed than the posterior. Valves rather pellucid, with the surface smooth and polished, being clothed at each extremity with delicate hairs; inner duplicatures of the anterior extremity remarkably broad, with the inner edge almost straight and vertical. Anterior antennæ with the terminal part exceedingly slender, almost twice as long as the basal one, and having all the joints narrow cylindrical in shape and equal in size, setæ rather slender. Posterior antennæ with the penultimate joint nearly as long as the antepenultimate one, and narrower than usual. Terminal joint of the mandibular palp nearly of same length as the preceding joint, but much narrower, slender cylindrical in shape. Palp of maxillipeds gradually tapered and exhibiting trace of a small terminal joint. Caudal rami exceedingly narrow and slightly flexuous, apical claws slender and curved in their outer part, the distal one exceeding half the length of the ramus. Genital lobes evenly rounded off.

*Male* of somewhat larger size than female, and having the posterior part of the shell comparatively broader. Prehensile palps of maxillipeds rather short and stout and, as usual, somewhat unequal, the right one being conspicuously broader than the left, which the outer edge strongly bowed throughout. Copulative appendages terminating in 2 unequal lappets, the upper one



rather large and triangularly produced. Ejaculatory tubes very large and distinctly observable through the pellucid shell.

Colour transparent whitish.

Length of female 0.95 mm., of male about 1 mm.

*Remarks.*—This form was first recorded in the year 1870 by Brady and Robertson as a species of *Candona*, and description and figures of it were also given in the more recent Monograph published by the first-named author in connection with Norman; but its true relation to *Candona* was first made out in the year 1891 by Våvra. I had myself long ago been aware of this beautiful Ostracod, but had erroneously identified it with *Candona fabæformis* (Fisher), a species not yet found within the limits of Norway.

*Occurrence.*—I have taken this form rather abundantly in some muddy creeks at the border of the Østensjø lake near Christiania, and more recently also at Grimstad, south coast of Norway. Male specimens seem to be fully as frequent as females and are readily recognised by the translucent large ejaculatory tubes.

*Distribution.*—Sweden (Alm), British Isles (Brady), Germany (G. W. Müller), Bohemia (Våvra), Switzerland (Kaufmann), Siberia (G. O. Sars).

### Group 3. Cyclocyprides.

*Remarks.*—This group as yet comprises 3 genera, viz., *Cyclocypris*, *Cypria*, and *Physocypris*, the validity of the last-named genus being however somewhat questionable. Owing to a certain resemblance found in the structure of the ejaculatory tubes and in the subdivision of the penultimate joint of the posterior antennæ in the male, G. W. Müller has combined this and the 2 preceding groups, to form a particular subfamily of the Cypridæ, *Candoninæ*, and Dr. Alm has recently adopted the same view, though proposing to change the name of this subfamily to *Candocyprinæ*. I think however that the arrangement here proposed might be found to be more appropriate, and in particular I must insist on the necessity of keeping the present group sharply apart from the *Candonides*, with which it scarcely exhibits any closer affinity, except in the 2 above-named characters. In habits, too, the forms comprised within the present group widely diverge from the *Candonides*, being, quite in contrast to the latter, exceedingly agile animals, more perfectly indeed equipped for swimming than most other Cypridæ.



Gen. 12. *Cyclocypris*, Brady & Norm., 1889.

*Generic Characters*.—Shell rather tumid, of a more or less rounded oval shape, with the dorsal face evenly vaulted. Valves subequal, with the inner duplicatures comparatively narrow. Eye well developed, with dark pigment. Both pairs of antennæ powerfully developed, and perfectly adapted for swimming. Natatory setæ of the posterior ones unusually prolonged, extending far beyond the tips of the apical claws; penultimate joint of these antennæ in male distinctly subdivided, but without any traces of sensory spines. Mandibular palp of quite normal structure. Maxillæ with the masticatory lobes comparatively short, palp of moderate size. Maxillipeds provided at the base with a rather fully developed vibratory plate edged with the normal number (6) of plumose setæ; palp in female comparatively small and simple, in male transformed in the normal manner, the dactylus being well defined from the propodus and of different shape in the 2 palps. Anterior legs not much elongated. Posterior legs rather larger, with 2 setæ inside the penultimate joint, and the terminal joint unusually produced, apical setæ 3 in number and very unequal, the outermost one being greatly prolonged and abruptly reflexed. Caudal rami well developed, sublinear in form, with the apical claws comparatively strong, dorsal seta small and rather remote from the apex. Copulative appendages of moderate size, terminating in one or 2 broadly rounded lappets. Ejaculatory tubes with 1 more or less densely crowded whorls of radiating spikes, proximal end of the tubes transversely truncated.

*Remarks*.—This genus was proposed in the year 1889 by Brady and Norman, to include the species recorded by the present author as *Cypris globosa*, the other species now comprised within this genus being retained by them in the genus *Cypria* of Zenker. From the latter genus, in the restriction at present adopted, it may at once be distinguished by the much more tumid shell, and in the structural details also some well marked differences are found. 4 species referable to this genus will be described in the sequel.

26. *Cyclocypris globosa*, G. O. Sars.

(Pl. XLII).

*Cypris globosa*, G. O. Sars, Zool. Reise i Christianias og Trondhjems Stifter 1862, p. 27.Syn: *Cypris cinerea*, Brady.. *Cyclocypris dispersa*, G. W. Müller.

*Specific Characters*.—*Female*. Shell very tumid, seen laterally, rounded oval in shape, greatest height in the middle and about equal to  $\frac{2}{3}$  of the

length, dorsal margin boldly arched, without any abrupt bend, ventral margin scarcely at all sinuated, anterior extremity obliquely rounded, posterior rather broader and obtusely blunted;—seen dorsally, broadly ovate in outline, with the greatest width somewhat behind the middle and about equal to the height, anterior extremity obtusely pointed, posterior rounded off. Surface of valves smooth and clothed with short hairs more conspicuous at each extremity, hyaline borders in front and behind, rather slight. Anterior antennæ with the terminal part about the length of the basal one, and having the joints gradually diminished in size, last joint very small, setæ much elongated and distinctly ciliated. Posterior antennæ with the penultimate joint scarcely more than half as long as the preceding joint; apical claws very slender and almost straight. Posterior legs with the terminal joint considerably exceeding half the length of the penultimate one, shortest apical seta comparatively small. Caudal rami considerably produced and perfectly straight, with the dorsal edge in its greater extent fringed with minute spinules, apical claws remarkably short and stout, the distal one scarcely exceeding  $\frac{1}{4}$  of the length of the ramus.

*Male*, as a rule, slightly larger than female, but scarcely differing from it in the shape of the shell. Prehensile palps of maxillipeds rather dissimilar, the right one having the propodos slightly narrowed distally, and the dactylus remarkably broad, sublamellar, and almost angularly curved; left palp with the propodos somewhat broader and exhibiting near the end inside a dentiform prominence, dactylus narrow falciform. Copulative appendages comparatively large, terminating in a broadly rounded lobe. Ejaculatory tubes remarkably short and massive, with the whorls of radiating spikes densely crowded and somewhat obliquely disposed in relation to the central duct.

Colour bright yellowish brown, somewhat darker in male than in female.

Length of adult female amounting to 0.88 mm.

*Remarks*.—This form was recorded as early as the year 1863 by the present author, but was not described in detail or figured. Yet, it has been well recognised by most subsequent authors, its comparatively large size rendering it indeed readily distinguishable from any of the other known species. The form recorded by Brady in his Monograph under the name of *Cypris cinerea* is evidently identical with the present species, the figures given having apparently been drawn from an immature specimen. G. W. Müller has proposed to change the specific name *globosa* to *dispersa*, but I do not find that such a change is required.

*Occurrence*.—I have taken this form in several places around Christiania in small pools and ditches liable to exsiccation during the summer. It is a

very active little animal, swimming about in the water with great dexterity, and is readily detected by its bright brownish colour. Male specimens occur in nearly same number as females.

*Distribution*.—Sweden (Alm), British Isles (Brady) Germany (G. W. Müller), Bohemia (Vávra), Switzerland (Kaufmann).

## 27. *Cyclocypris ovum*, (Jurine).

(Pl. XLIII, fig. 1).

*Monoculus ovum*, Jurine, Hist. des Monocles, p. 179, Pl. XIX, figs. 18, 19.

Syn: *Cypris minuta*, Baird.

— *lævis*, G. O. Sars (not Müller).

— *pygmæa*, Cronenberg.

*Specific Characters*.—*Female*. Shell, seen laterally, rather regularly oval or elliptical in shape, greatest height in the middle and scarcely attaining  $\frac{2}{3}$  of the length, dorsal margin quite evenly arched, sloping however more steeply behind than in front, ventral margin nearly straight, both extremities evenly rounded off, the posterior somewhat more obtuse than the anterior;—seen dorsally, regularly oval in outline, greatest width in the middle and about equal to  $\frac{1}{3}$  of the length, both extremities somewhat blunted. Valves only slightly hairy, with the surface smooth and polished. Posterior legs with the terminal joint about half the length of the penultimate one, middle apical seta comparatively small, scarcely half as long as the terminal joint, and sigmoid curved. Caudal rami less produced than in *C. globosa*, dorsal edge exhibiting at some distance from the base a few extremely small denticles, apical claws of moderate size, the distal one nearly attaining half the length of the ramus.

*Male* resembling the female both in size and in the shape of the shell, but exhibiting the usual sexual differences.

Colour of both sexes a more or less bright chestnut brown.

Length of adult female scarcely exceeding 0.50 mm.

*Remarks*.—The identity of the above-described form with Jurine's *Monoculus ovum* seems to me to be beyond doubt. This species has however by several authors, and also by myself been formerly recorded under the name applied here to the next species, and in some cases quite new specific names have been introduced. It is one of our smallest fresh-water Ostracoda, and the names applied to it by Baird and Cronenberg allude indeed herto.

*Occurrence*.—I have met with this small Ostracod rather abundantly in many places around Christiania, and it is most probably distributed over the



greater part of our country. In spite of its small size, it may easily be detected by the bright chestnut brown colour of the shell.

*Distribution*.—Sweden (Lilljeborg), British Isles (Brady), Germany (G. W. Müller), Switzerland (Kaufmann), Siberia (G. O. Sars), North America (Turner).

## 28. *Cyclocypris lævis* (O. Fr. Müller).

(Pl. XLIII, fig. 2).

*Cypris lævis*, O. Fr. Müller, Entomostraca, p. 52, Pl. III, figs. 7—9.

Syn: *Cypris minuta*, G. O. Sars (not Baird).

    " — *pantherina*, Fischer.

    " *Cyclocypris serena*, G. O. Sars (not Koch).

*Specific Characters*.—*Female*. Shell very short and high, seen laterally, rounded trigonal in shape, greatest height in the middle and almost attaining  $\frac{3}{4}$  of the length, dorsal margin gibbously arched in the middle, ventral margin straight, both extremities rounded off, the posterior blunter than the anterior;—seen dorsally, broadly ovate in outline, greatest width behind the middle and about equal to the height, anterior extremity somewhat narrowed, posterior broadly rounded. Valves more densely hairy than in the preceding species, and exhibiting a peculiar tessellated pattern of the surface. Posterior legs with the terminal joint about half the length of the penultimate one, middle apical seta comparatively longer than in *C. ovum* and distinctly sigmoid. Caudal rami of about same shape as in that species, but distinguished by a rather peculiar armature of the dorsal edge at the base, consisting of a knob-like prominence exerted into 3 sharp points and followed proximally by a row of 4 well marked denticles.

*Male* scarcely differing from the female, except by the usual sexual characters.

Colour dark brownish grey, with a more or less distinct olivaceous tinge.

Length of adult female 0.50 mm.

*Remarks*.—Though the identity of the above-described form with *Cypris lævis* of O. Fr. Müller appears to me to be very questionable, it is here recorded under that specific name, as it has been so named by most recent authors. It is of about the same small size as *C. ovum*, with which it indeed seems often to have been confounded. On a closer examination, it may however easily be distinguished from that species by the comparatively higher and more tumid shell, and in the fresh condition also by its rather different colour. The peculiar armature of the caudal rami at the base, described above, seems to



have quite escaped the attention of earlier authors. I have found it perfectly constant in all the specimens more closely examined by me.

*Occurrence.*—This species is of very common occurrence around Christiana, being found, often in great abundance, in shallow ditches and pools with grassy bottom. In habits it resembles the preceding species, though being perhaps somewhat less agile.

*Distribution.*—Throughout Europa, Central Asia, North America.

## 29. *Cyclocypris serena* (Koch).

(Pl. XLIII, fig. 3).

*Cypris serena*, Koch, Deutschlands Crustaceen, H. XXI. 22.

Syn: *Cypris lævis*, Brady (not O. Fr. Müller).

• *Cyclocypris ovum serena*, Alm.

*Specific Characters.*—*Female.* Shell seen laterally, broadly oval in shape, greatest height in the middle and almost attaining  $\frac{3}{4}$  of the length, dorsal margin boldly and rather evenly arched throughout, ventral margin not at all sinuated, both extremities bluntly rounded and nearly equal;—seen dorsally, broadly ovate in outline, greatest width somewhat behind the middle and equal to the height, anterior extremity somewhat more narrowed than the posterior. Surface of valves smooth and polished, being clothed at each extremity with delicate hairs. Posterior legs with the terminal joint scarcely half as long as the penultimate one, middle apical seta about the length of the terminal joint and simply curved at the end. Caudal rami of moderate size and slightly curved, dorsal edge nearly smooth, with only very slight trace of an armature at the base, apical claws comparatively more slender than in the preceding species, the distal one fully attaining half the length of the ramus.

*Male* closely resembling the female both in size and in the shape of the shell. Prehensile palps of maxillipeds less conspicuously unequal than in *C. globosa*, the dactylus of the right one being comparatively smaller, though much broader than on the left palp. Copulative appendages and ejaculatory tubes likewise differing in shape conspicuously from those parts in the said species.

Colour in both sexes dark olivaceous brown.

Length of adult female amounting to 0.60 mm.

*Remarks.*—I am by no means convinced that the above-described form is in reality identical with *Cypris serena* of Koch, which I should be more inclined to refer to the preceding species. As I however feel some reluctance in augmenting the long list of specific names proposed within the present

genus with a new one, I have preferred to record it here under the name by which it has been very recognisably described by Kaufmann and more recently also mentioned by Dr. Alm. The latter author has however questioned its true specific validity, regarding it merely as a variety or subspecies of *C. ovum* and naming it, in accordance therewith, *C. ovum serena*. In my opinion the present form ought to be regarded as a well defined species, differing, as it does, from *C. ovum* rather conspicuously both in size and in the shape of the shell, and moreover exhibiting some well marked differences in the structural details, as pointed out in the above diagnosis.

*Occurrence*.—Several specimens of this form, both males and females, were taken, some years ago, in our largest lake, Mjøsen, at Hamar. They occurred together with some other Ostracoda in a few fathoms deep, on a muddy bottom overgrown with aquatic plants.

*Distribution*.—Sweden (Alm), British Isles (Brady), ? Germany (Koch), Switzerland (Kaufmann).

### Gen. 13. *Cypria*, Zenker, 1854.

*Generic Characters*.—Shell short and high, but much compressed, with the valves slightly unequal, the left one being the larger and somewhat overlapping the right at both extremities; pellucid borders well observable. Eye large and conspicuous. Antennæ well adapted for swimming, and on the whole resembling in structure those in *Cyclocypris*, except that the subdivided penultimate joint of the posterior ones in the male is provided with 2 well-marked sensory spines, as in the *Candonides*. Mandibular palp with the terminal joint unusually produced. Maxillæ with the masticatory lobes much reduced in size, palp however rather large, with the proximal joint somewhat lamellar and bowed behind, distal joint small. Maxillipeds with the vibratory plate perfectly developed, palp in female simple lash-shaped, in male, as usual, prehensile and very unequal on each side, the right one being much more powerfully developed than the left. Anterior legs of moderate size. Posterior legs with only a single seta inside the penultimate joint, terminal joint less produced than in *Cyclocypris*, with the 2 innermost setæ very small and subequal, the outermost much prolonged and abruptly reflexed. Caudal rami resembling in structure those in the said genus, but without any armature of the dorsal edge at the base. Copulative appendages comparatively small, terminating in 2 juxtaposed narrow lappets. Ejaculatory tubes, as in the preceding genus, with 7 whorls of radiating spikes, but having the proximal end bladderformy produced.

*Remarks.*—This genus was proposed as early as the year 1854 by Zenker, but was taken by that author in a much wider sense than now generally admitted. In the restriction at present adopted it is nearly allied to *Cyclocypris*, but at once recognised from that genus by the much more compressed shape of the shell, and also in the structural details some well marked differences are found, as pointed out in the above given diagnosis. Several species referable to this genus have been recorded from different parts of the world. To the Norwegian Fauna belong 3 species, to be described in the sequel.

### 30. *Cypria exsculpta*, (Fischer).

(Pl. XLIV)

*Cypris exsculpta*, Fischer, Beitrag zur Kenntniss der Ostracoden, p. 18, Pl. XIX, figs. 36—38.

Syn: *Cypris elegantula*, Lilljeborg (not Fischer).

„ *Cypria punctata* var. *striata*, Zenker.

„ *Cypris striolata*, Brady.

*Specific Characters.*—*Female.* Shell, seen laterally, rounded trigonal in shape, greatest height in the middle and equal to  $\frac{2}{3}$  of the length, dorsal margin boldly arched throughout, ventral margin not at all sinuated, being even somewhat convex in the middle, both extremities evenly rounded off;—seen dorsally, narrow oblong in outline, with the greatest width scarcely exceeding  $\frac{2}{5}$  of the length, side-edges almost straight, both extremities obtusely pointed. Surface of valves very finely striated longitudinally and clothed at each extremity with scattered delicate hairs. Caudal rami comparatively narrow and almost straight, with the dorsal edge smooth, apical claws rather slender, the distal one somewhat exceeding half the length of the ramus.

*Male* of somewhat smaller size than female and having the posterior part of the shell comparatively more expanded. Right prehensile palp of maxillipeds with the propodos conspicuously dilated at the end, forming inside a thumb-like acuminate projection, to the side of which a thin spiniform appendage is attached, dactylus very strong and evenly curved, with a dentiform prominence in the middle of the concave edge; left palp less strongly built, with the propodos not at all dilated at the end, and the dactylus much smaller. Copulative appendages with the terminal lappets not much produced, the upper one narrower than the lower.

Colour light olivaceous brown.

Length of adult female amounting to 0.85 mm.

*Remarks.*—This form, first described by Fisher under the above name, may be easily distinguished from the other 2 species here recorded by its



considerably larger size and by the delicate longitudinal striation of the valves, this latter character having indeed given rise to the specific names proposed by Fischer and Brady.

*Occurrence*.—I have met with this form occasionally in shallow grassy swamps near Christiania, and in some cases rather abundantly. The animals are very habile swimmers, moving about in the water rather quickly. Male specimens are by no means rare, and are often seen in copulation with the females.

*Distribution*.—Sweden (Lilljeborg), British Isles (Brady), Germany (Zenker), Switzerland (Kaufmann), Russia (Fischer), North America (Turner).

31. *Cypria* <sup>hy</sup>*opthalmica*, (Jurine).  
(Pl. XLV, fig. 1).

*Monoculus opthalmicus*, Jurine, Hist. des Monocles, p. 178, Pl. XIX, figs 16, 17.

Syn: *Cypris punctata*, Koch.

„ *Cypris compressa*, Baird.

„ *Cypris elegantula*, Fischer.

*Specific Characters*.—*Female*. Shell very short and high, seen laterally, broadly and somewhat irregularly rounded in shape, greatest height in the middle and almost attaining  $\frac{3}{4}$  of the length, dorsal margin very strongly arched, forming a bold an even curve sloping steeply both in front and behind, ventral margin straight or very slightly sinuated in the middle, both extremities evenly rounded off and somewhat deflexed;—seen dorsally, narrow oblong in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length, anterior extremity more pointed than the posterior. Surface of valves quite smooth, without any trace of a striation, but all over adorned with dark pigmentary specks; pellucid border in front and behind more conspicuous than in the preceding species. Caudal rami comparatively broader than in that species and having the dorsal edge in its greater extent fringed with delicate spinules, apical claws moderately strong, the distal one about half the length of the ramus.

*Male*, as in the preceding species, somewhat smaller than female, with the posterior part of the shell comparatively broader and more bluntly rounded behind. Right prehensile palp of maxillipeds conspicuously expanded distally, with a well-marked conical prominence inside at the base of the thumb, the latter terminating in a spiniform process somewhat swollen at the base; dactylus almost attaining the length of the propodos, and having the inner edge slightly bowed in the middle; left palp resembling in shape that in the preceding



species. Copulative appendages with the terminal lappets rather produced, the upper one somewhat larger than the lower and more obtuse at the end.

Colour in both sexes pale yellowish, with a more or less distinct chocolate tinge especially dorsally; specks of the valves dark brown.

Length of adult female scarcely exceeding 0.65 mm.

*Remarks.*—This form was recorded as early as the year 1820 by Jurine as *Monoculus ophthalmicus*, and has subsequently been described under several other specific names, as mentioned in the above-given list of synonyms. It is readily recognised from the other 2 species here recorded by the very conspicuous dark specks, with which the valves are adorned, and which scarcely in any case are wanting.

*Occurrence.*—The present little beautiful Ostracod is found rather commonly around Christiania in small ponds and ditches and has probably a wide distribution over our country. In habits it perfectly agrees with the preceding species.

*Distribution.*—Throughout Europe, North Africa, Siberia, North America.

### 32. *Cypria lacustris*, G. O. Sars.

(Pl. XLV, fig. 2).

*Cypria lacustris*, G. O. Sars, Oversigt af Norges Crustaceer II, p. 54.

*Specific Characters.*—*Female.* Shell not nearly so strongly vaulted above as in the preceding species, seen laterally, suboval in shape, with the greatest height scarcely exceeding  $\frac{2}{3}$  of the length, dorsal margin forming a quite even curve throughout, ventral margin slightly sinuated in the middle, both extremities rounded off;—seen dorsally narrow lanceolate in outline, with the greatest width scarcely exceeding  $\frac{1}{3}$  of the length, both extremities obtusely pointed. Valves very pellucid, with the surface smooth and polished, wanting any traces of the dark specks, so conspicuous in the preceding species, hyaline borders in front and behind remarkably broad. Caudal rami conspicuously more slender than in that species and somewhat curved, apical claws less unequal, the distal one about half the length of the ramus.

*Male*, as usual, smaller than female and having the posterior part of the shell broader and more deflexed. Right prehensile palp of maxillipeds rather abruptly expanded at the end, but without any trace of the conical prominence found in the preceding species inside the thumb, the latter simply lanceolate in shape; dactylus coarser than in either of the 2 preceding species, with the inner edge strongly bulging in the middle. Left palp conspicuously narrowed

in its outer part, with the dactylus quite short, hamiform curved and exhibiting at the base inside a knob-like prominence. Copulative appendages with both terminal lappets lanceolate in shape and nearly equal-sized.

Colour in both sexes transparent white, with a faint yellowish tinge.

Length of adult female scarcely exceeding 0.60 mm.

*Remarks.*—This form was briefly announced by the present author in 1890 under the manuscript name *lacustris* proposed by Lilljeborg. The validity of the species has however not been admitted by Dr. Alm, who regards it as merely a slight variety of *C. ophthalmica*. In order to settle this question, I have subjected both these forms to a renewed detailed examination, and have thereby convinced myself on their specific distinctness.

*Occurrence.*—I have found this form very abundantly in several of our larger lakes, down to very considerable depths. Though the animals are well equipped for swimming, they keep constantly near the bottom, over which they move in the usual manner.

*Distribution.*—Sweden (Lilljeborg).

#### Group 4. Notodromides.

*Remarks.*—In accordance with Dr. Kaufmann, I refer to this group the 2 anomalous genera *Notodromas* Lilljeborg and *Cyprois* Zenker, which, though rather sharply defined the one from the other, yet exhibit some characters in common not found in the other groups here recorded. To these genera may moreover be added the genus *Newnhamia* King, which evidently is closely allied to *Notodromas*, and the genus *Hungarocypris* Vávra, which shows some relations to *Cyprois*. Only the 2 first-named genera are represented in the Fauna of Norway.

#### Gen. 14. *Notodromas*, Lilljeborg, 1853.

*Generic Characters.*—Shell short and stout, with the dorsal face evenly vaulted, ventral flattened and exhibiting in the middle a sharply defined navicular area, surface of valves otherwise quite smooth. Eye distinctly divided in the middle so as to appear double. Antennæ well adapted for swimming, the posterior ones with the penultimate joint distinctly subdivided in both sexes, the 3 outer joints remarkably slender and narrow, apical claws imperfectly developed. Mandibles of normal structure. Maxillæ with the palp of moderate

size, outermost masticatory lobe comparatively large and armed on the end with 6 coarse unguiform spines of equal size. Maxillipeds without any trace of a vibratory plate, palp in female simple, lash-shaped, in male, as usual, prehensile and very unequally developed on each side. Anterior legs comparatively small, with the basal part quite simple, 1st joint of terminal part rather dilated and provided anteriorly with a remarkably strong plumose seta, apical claw not much prolonged. Posterior legs with the penultimate joint not subdivided and provided with a single slender seta inside in the middle, terminal joint comparatively small and tipped with 3 setæ not very unequal in length. Caudal rami attenuated and connected with each other in the greater extent of their length, each carrying on the tip 3 closely set setiform claws, the proximal one apparently answering to the dorsal seta in other Cyprids; apical bristle wanting. Copulative appendages of male rather massive and each provided with a movable band-like lappet curved upwards. Ejaculatory tubes with both extremities pronouncedly funnel-shaped, radiating spikes arranged in numerous densely crowded whorls, with scarcely any distinctly visible interspaces between them.

*Remarks.*—This genus was established in the year 1853 by Lilljeborg, to include the form recorded by O. Fr. Müller as *Cypris monacha* and subsequently adduced by Zenker to his genus *Cyprois*. From this genus, in the restriction now adopted, it is however very sharply defined. In addition to the European species described below, 2 other species have been recorded from more southern latitudes, the one from Sumatra, the other from Ceylon. As above mentioned, the genus *Newnhamia* of King is closely allied to the present genus, from which it only seems to differ by the rough sculpture of the shell.

### 33. *Notodromas monachus*, (O. Fr. Müller).

(Pl. XLVI, Pl. XLVII, fig. 1).

*Cypris monacha*, O. Fr. Müller, Entomostraca, p. 60, Pl. V, figs. 6—8.

Syn: *Monoculus monachus*, Jurine.

„ *Cypris bimuricata*, Koch.

„ *Cyprois monacha*, Zenker.

*Specific Characters.*—*Female*. Shell moderately tumid, seen laterally, rounded subquadrangular in shape, greatest height a little behind the middle and about equal to  $\frac{2}{3}$  of the length, dorsal margin strongly curved behind, but sloping rather slowly to the anterior extremity, ventral margin perfectly straight and sharply defined both in front and behind, anterior extremity broadly rounded, posterior obtusely blunted;—seen dorsally or ventrally, regularly



ovate in outline, greatest width behind the middle and about equal to  $\frac{2}{3}$  of the length, anterior extremity sharply pointed, posterior obtuse. Ventral impressed area of a somewhat navicular shape and occupying the greater length of the shell, being defined on each side by a well marked keel. Surface of valves smooth, with scattered delicate hairs at each extremity, infero-posteal corner of left valve produced to a short tooth-like prominence; both valves exhibiting in front a rather broad pellucid marginal zone. Anterior antennæ with the basal part rather dilated, terminal part slightly longer and having the 1st joint much larger than the others, almost occupying half the length of that part. Posterior antennæ with the last joint fully as long as the penultimate one and carrying on the tip a slender setiform claw accompanied by 2 or 3 small bristles, claws of the penultimate joint replaced by 3 setæ one of which is peculiarly bent at the tip; natatory setæ of these antennæ extending as far as the apical claw. Caudal rami of moderate size and only slightly curved, apical claws gradually diminishing in length proximally, the distal one somewhat exceeding half the length of the ramus.

*Male* of somewhat larger size than female, and conspicuously differing from it in the shape of the shell, which, seen laterally, appears conspicuously dilated behind the middle, with the ventral margin in that place considerably bowed, the posterior extremity exerted to an obtuse lappet and wanting any trace of a dentiform projection. Prehensile palps of maxillipeds very powerfully developed and conspicuously dissimilar both in size and shape; propodos of left palp somewhat lamellar, sub-oval in form, with the inner edge angularly bent near the middle and the outer edge terminating in a somewhat securiform lamella; propodos of right palp almost twice as long and narrow fusiform in shape, with a small seta at the end inside; dactylus of both palps slender, somewhat compressed at the base and exerted to a thin setiform lash. Caudal rami considerably more curved than in female and also comparatively narrower.

Colour in both sexes rather peculiar: upper part of the shell of a pale, opaque whitish hue gradually passing over below to a dark, almost black shadow, which extends along the lower part of the shell and curves upwards in front, so as to occupy the greater part of the anterior extremity.

Length of adult female amounting to 1.10 mm., of male to 1.20 mm.

*Remarks.*—This easily recognisable Ostracod was described as early as the year 1785 by O. Fr. Müller, and has subsequently been observed by many other authors, all of them having adopted for it the specific name originally proposed, with the only exception of Koch, who did not recognise this form,

but recorded it as a new species of the genus *Cypris* under the name *C. bimuricata*.

*Occurrence*.—I have taken this form very abundantly in some small creeks with clear water and rich bottom vegetation, located at the border of the Østensjø lake near Christiania, and I have also met with it in 2 other localities of our country, viz., at Hamar and at Sandøsund. The swimming power of this form is very highly developed, and the animals are almost found in constant motion, swimming about in the water with great dexterity. In some cases, especially at sunny weather, they ascend to the very surface, moving below it in a more or less gyrating manner, with the back downwards and the belly in immediate contact with the surface, the boat-shaped ventral area apparently serving as a suspending apparatus for that purpose. This peculiar behaviour of the animal, also described by King in the case of *Newnhamia*, has indeed given rise to the generic name proposed by Lilljeborg. *Male* specimens occur in about same number as the females, and are easily recognised from them by the rather different shape of the shell.

*Distribution*.—Throughout Europe, Central Asia (G. O. Sars), North America (Turner).

### Gen. 15. *Cyprois*, Zenker, 1854.

*Generic Characters*.—Shell short and high, somewhat exerted behind, without any sharply defined ventral area, pellucid borders of the valves very conspicuous and closely striated transversally. Eye simple, not divided. Antennæ well adapted for swimming, the posterior ones of normal structure, though more slender than usual, penultimate joint not subdivided in either of the sexes, last joint comparatively small, apical claws normally developed. Mandibles of usual structure. Maxillæ with the outermost masticatory lobe, as in *Notodromas*, very coarse, and armed with 6 unguiform spines. Maxillipeds provided at the base with a well defined vibratory plate; prehensile palps in male far less powerfully developed than in *Notodromas* and less unequal on both sides. Anterior legs of quite normal appearance. Posterior legs with the terminal joint extremely small and partly embraced by the end of the preceding joint; apical setæ only 2 in number, the 3rd being replaced by a small dentiform prominence. Caudal rami resembling in structure those in *Notodromas*, but having a well defined apical bristle in front of the claws. Copulative appendages of male very complicate, with several freely projecting

lappets. Ejaculatory tubes more slender than in *Notodromas*, but, as in that genus, provided with numerous densely crowded whorls of radiating spikes, ends of the tubes funnel-shaped, but less sharply marked off than in the said genus.

*Remarks.*—This genus was proposed in the year 1854 by Zenker, to include 2 species, the one of which is that described below, the other being *Cypris monacha* O. Fr. Müller, which now is removed as the type of a different genus, *Notodromas*. The differences between these 2 genera are indeed very conspicuous, though in the structural details they have some characteristic features in common, as pointed out in the above diagnosis.

#### 34. *Cypris marginata*, (Strauss).

(Pl. XLVII, fig. 2, Pl. XLVIII).

*Cypris marginata*, Strauss, Mém. Mus. Paris, Vol. 7, p. 59, Pl. 1, figs. 20—22.

Syn: *Cypris flava*, Zaddach.

” — *dispar*, Fischer.

• *Cypris dispar*, Zenker.

• — *flava*, Brady & Norm.

*Specific Characters.*—*Female.* Shell somewhat compressed, seen laterally, broadly ovate or more properly subtriangular in shape, being considerably higher in front than behind, greatest height about in the middle and somewhat exceeding  $\frac{2}{3}$  of the length, dorsal margin strongly arched in the middle and sloping rather steeply behind, more slowly in front, exhibiting in the ocular region a faint concavity, ventral margin very slightly sinuated or nearly straight, anterior extremity remarkably broad, almost semicircularly rounded off, posterior obliquely deflexed and gradually narrowed, to form below a somewhat projecting obtuse corner;—seen dorsally, oblong ovate in outline, greatest width behind the middle and only slightly exceeding  $\frac{2}{5}$  of the length, anterior extremity narrowly produced, posterior more obtuse. Valves subequal, with the surface quite smooth and clothed at each extremity with scattered delicate hairs, pellucid border very conspicuous in front and behind, being continued also dorsally and ventrally as a narrow stripe, thus encircling the whole shell; inner duplicatures rather broad in front. Eye comparatively small, but with dark pigment. Anterior antennæ with the terminal part considerably longer than the basal one, its 1st joint about the length of the 2 succeeding joints combined. Posterior antennæ with the penultimate joint very narrow and fully as long as the preceding joint, apical claws rather slender and present in the usual number, the outermost one however much reduced in size; natatory



setæ extending to the tip of the claws. Caudal rami almost straight and gradually attenuated, apical claws slender, the distal one considerably exceeding half the length of the ramus, proximal claw (the transformed dorsal seta) nearly as long as the middle one.

*Male* of somewhat smaller size than female, but resembling it in the general shape of the shell, except that the posterior corner appears somewhat less produced and more evenly rounded off. Prehensile palps of maxillipeds of almost equal size and only slightly differing in shape, propodos of left palp however exhibiting at the end inside a rather conspicuous sinus not found on the right, dactylus of the latter palp rather broader and more compressed than on the left. Caudal rami considerably more curved than in female. Copulative appendages strongly chitinised, of a more or less dark brown colour, with 2 of the projecting lappets very conspicuous and somewhat spoon-shaped, the one issuing from the lower face and curving anteriorly, the other from the upper face and curving in the opposite direction, a 3rd lappet of a more simple shape extending from the posterior end of the appendage.

Colour in both sexes pale yellow, being in old specimens somewhat darker, ochraceous.

Length of adult female amounting to 1.70 mm., of male to 1.52 mm.

*Remarks.*—This is the only as yet known species of the present genus. Its identity with the form recorded by Strauss was first settled by the present author in the year 1890 and has been admitted by all recent authors. Previously this form had been described under 2 different specific names quoted in the above given list of synonyms.

*Occurrence.*—I have taken this form, many years ago, rather abundantly in some small ponds and ditches near Christiania, now destroyed by new-building, and I have also met with this Ostracod in 2 other localities of our country, viz., at Moss and near Nevlunghavn, outside the Christiania Fjord. The animals are rather active, swimming quickly about in the usual manner, but never showing any attempt to the peculiar behaviour described above in *Notodromas*. Male specimens are not seldom found, but appear on the whole to be more scarce than female ones. I have taken this form as late in the year as in October, and it cannot therefore be considered to be an exclusive vernal form, as believed by Dr. Alm.

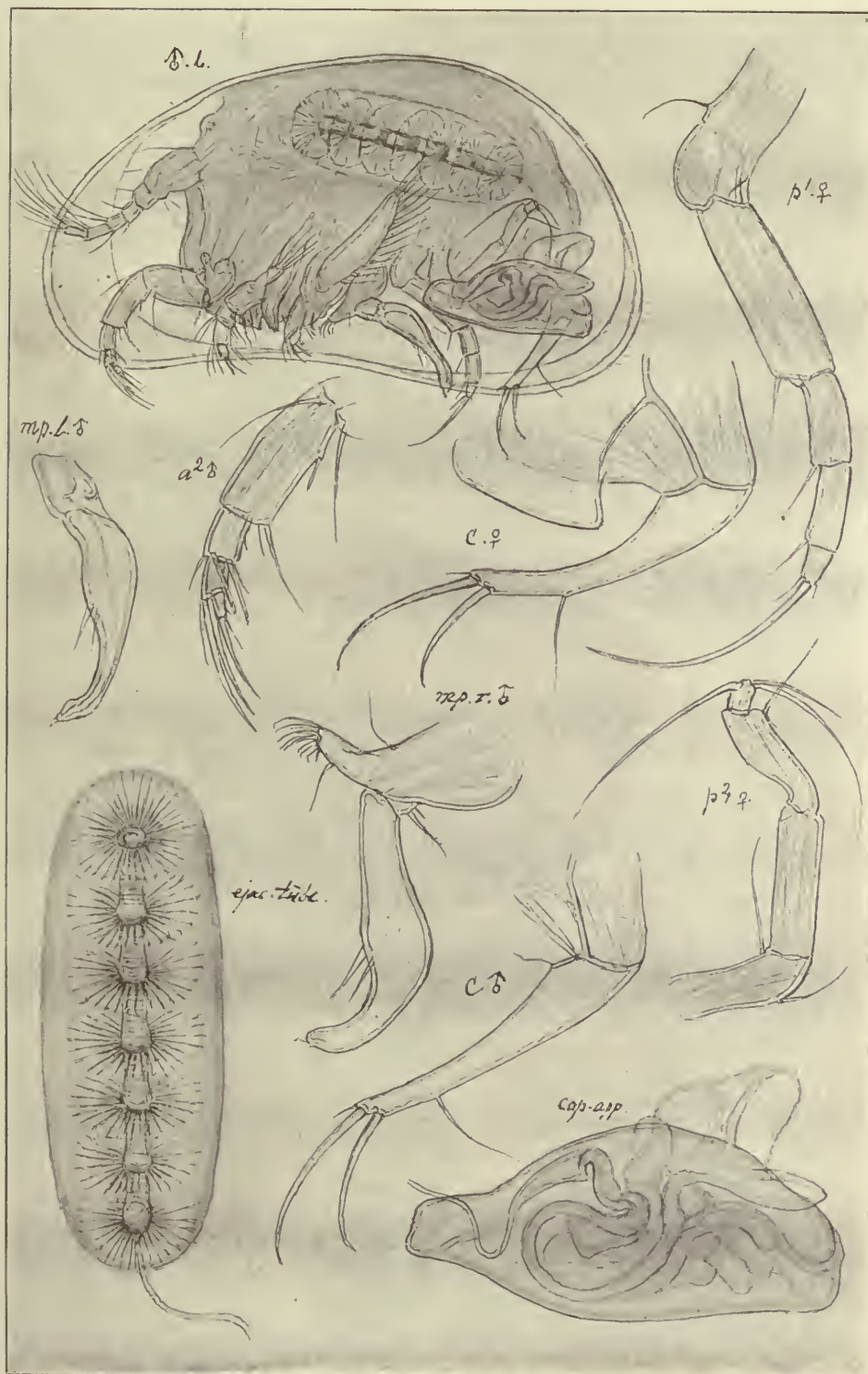
*Distribution.*—Throughout Europe, North America (Turner).

# Ostracoda

Cypridæ

Podocopa

Pl. XXXIII



G. O. Sars del.

*Candona candida*, (O. Fr. Müller)  
(continued)



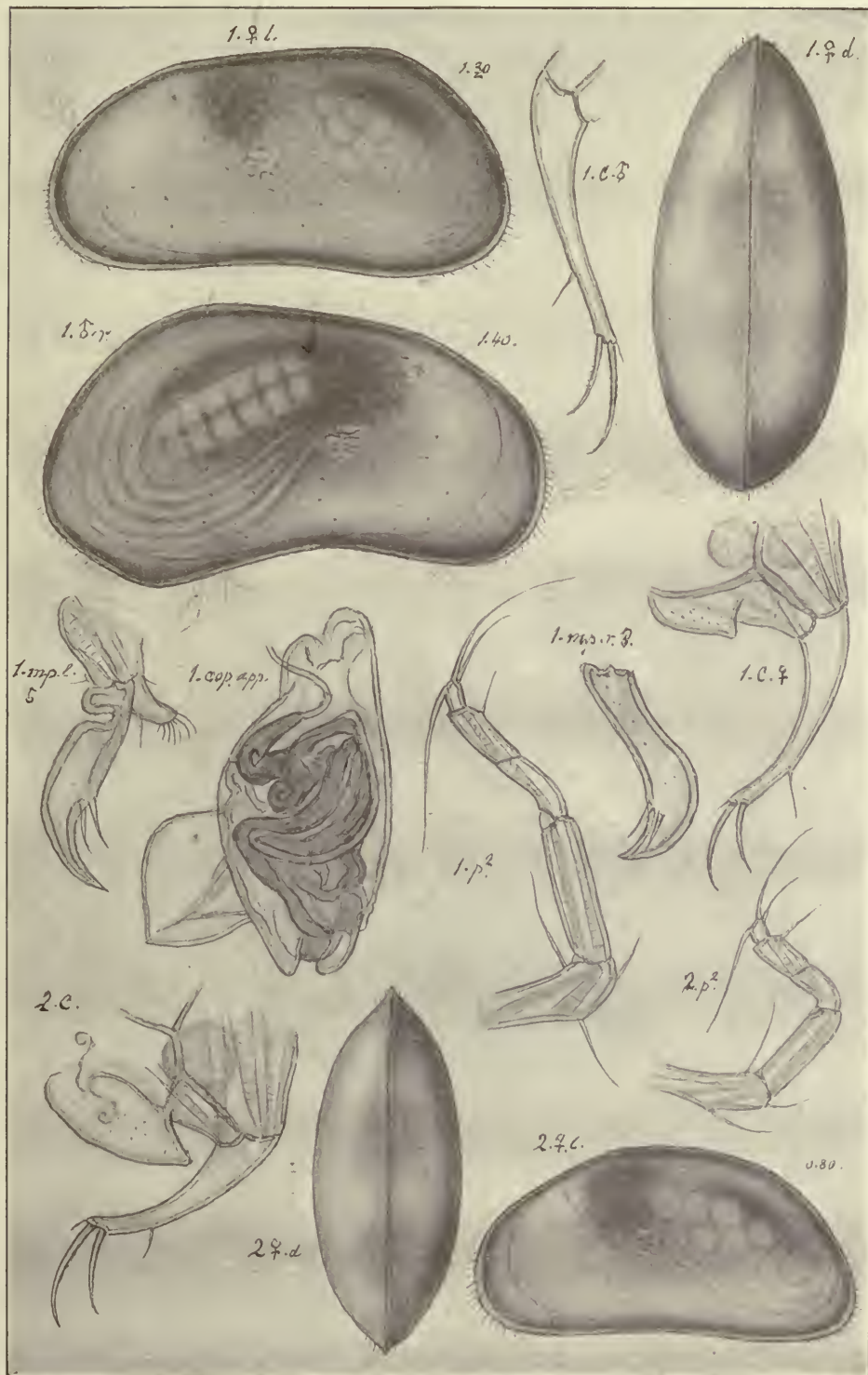


# Ostracoda

Cypridæ

Podocopa

Pl. XXXIV



G. O. Sars del.

1. *Candona neglecta*, G. O. Sars
2. „ *lapponica*, Ekman

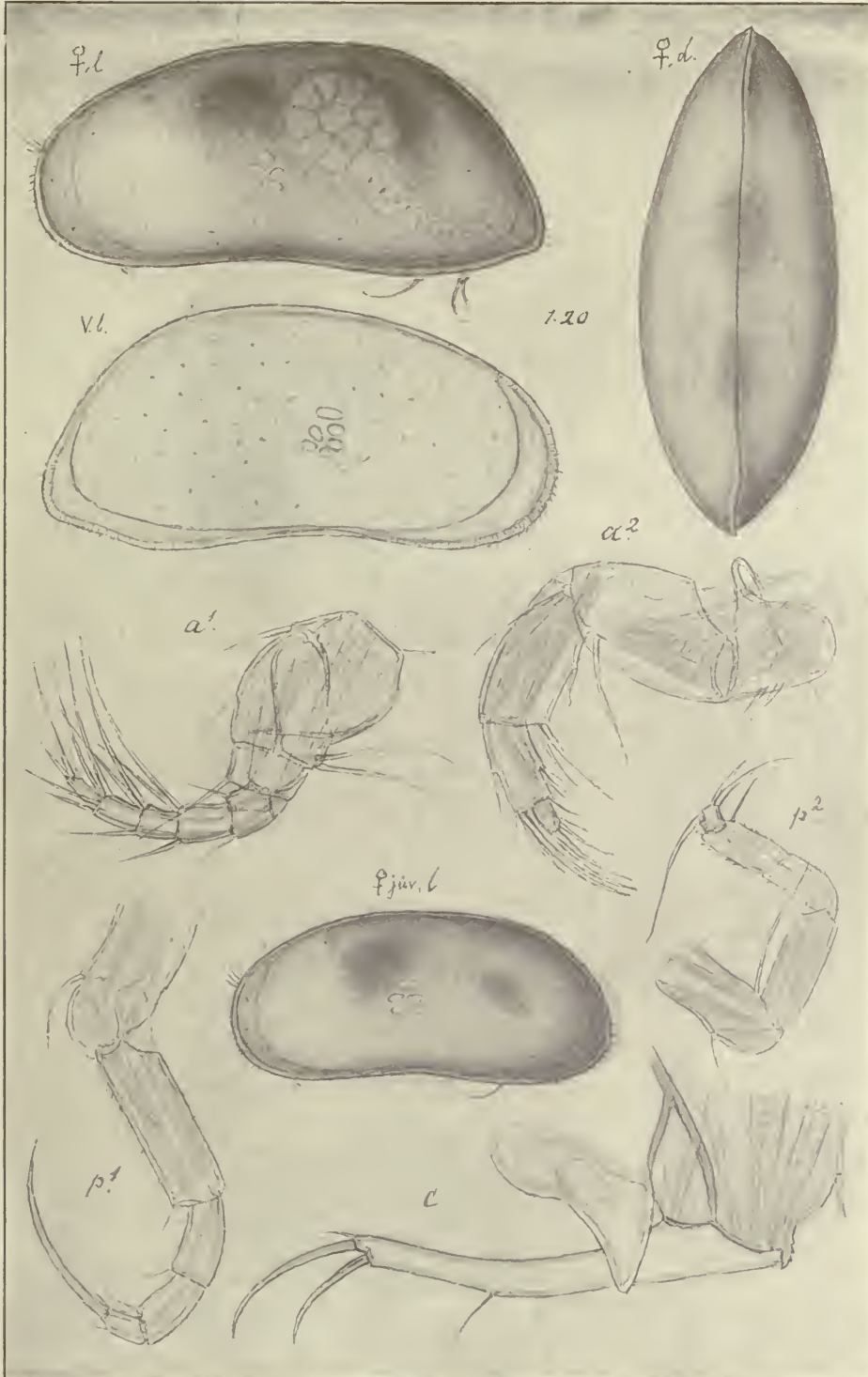


# Ostracoda

Cypridæ

Podocopa

Pl. XXXV



G. O. Sars del.

*Candona caudata*, Kaufmann



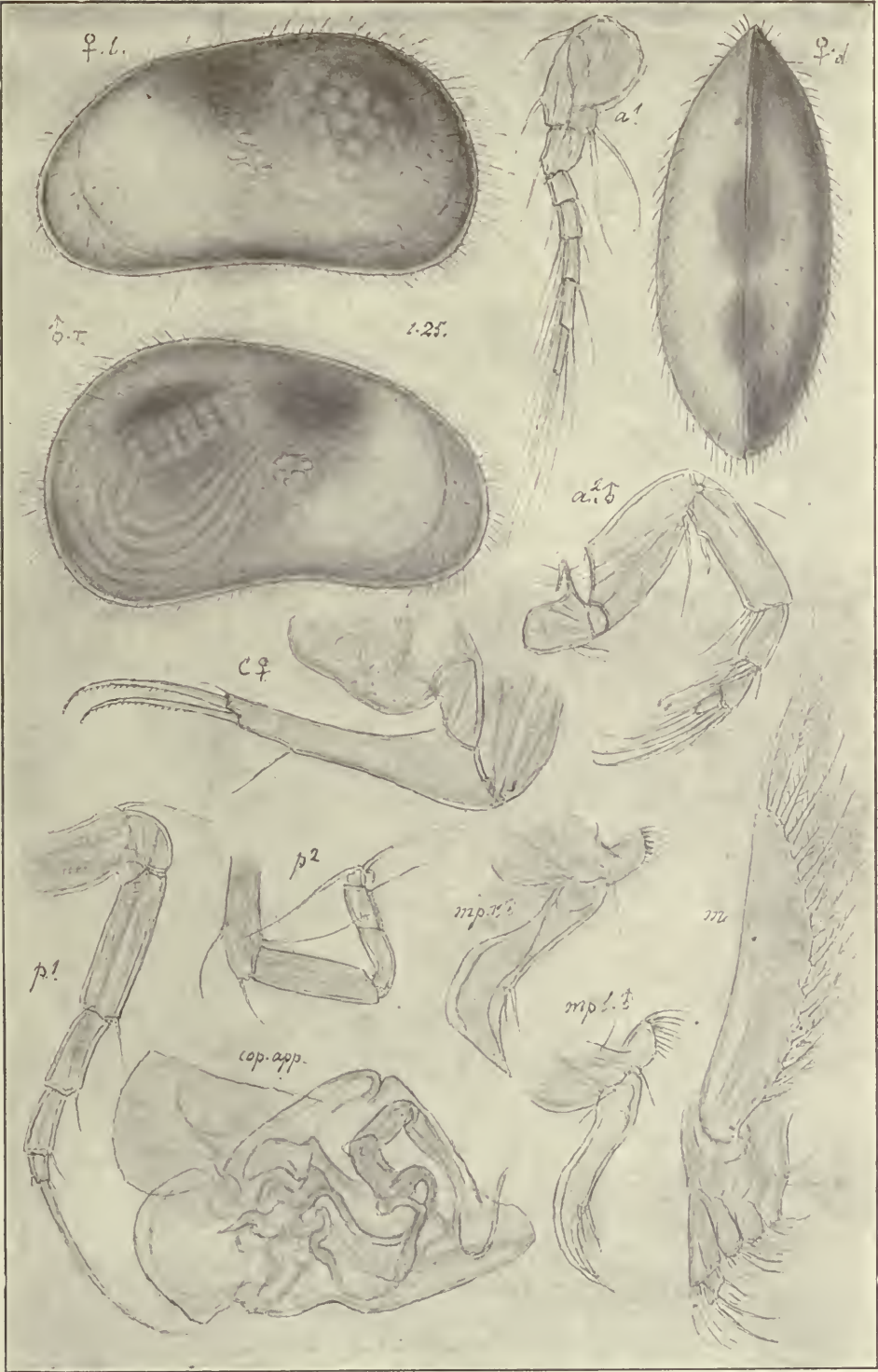


# Ostracoda

Cypridæ

Podocopa

Pl. XXXVI



G. O. Sars del.

*Candona Sarsi*, Hartwig



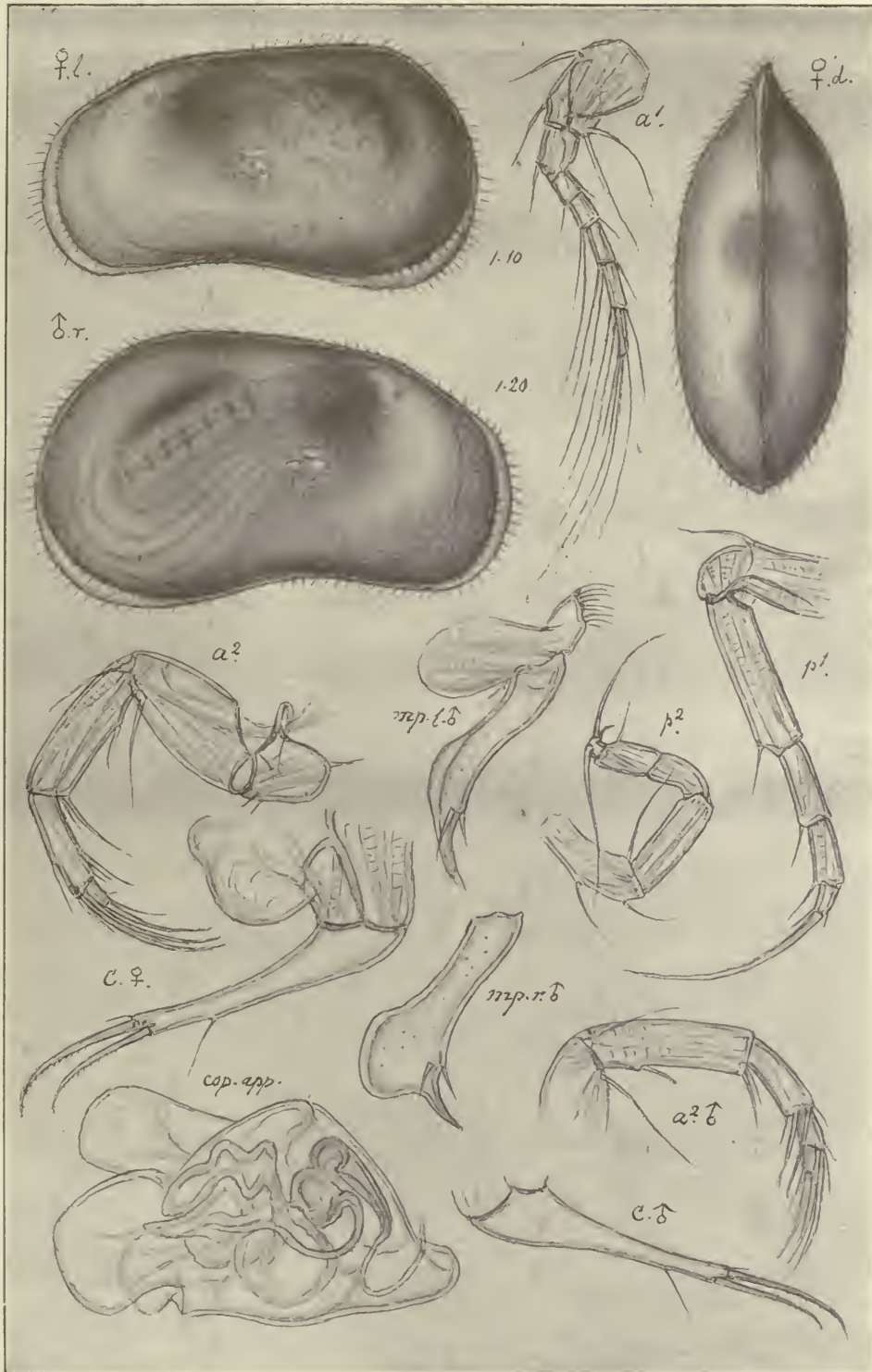


# Ostracoda

Cypridæ

Podocopa

Pl. XXXVII



G. O. Sars del.

*Candona rostrata*, Brady & Norman

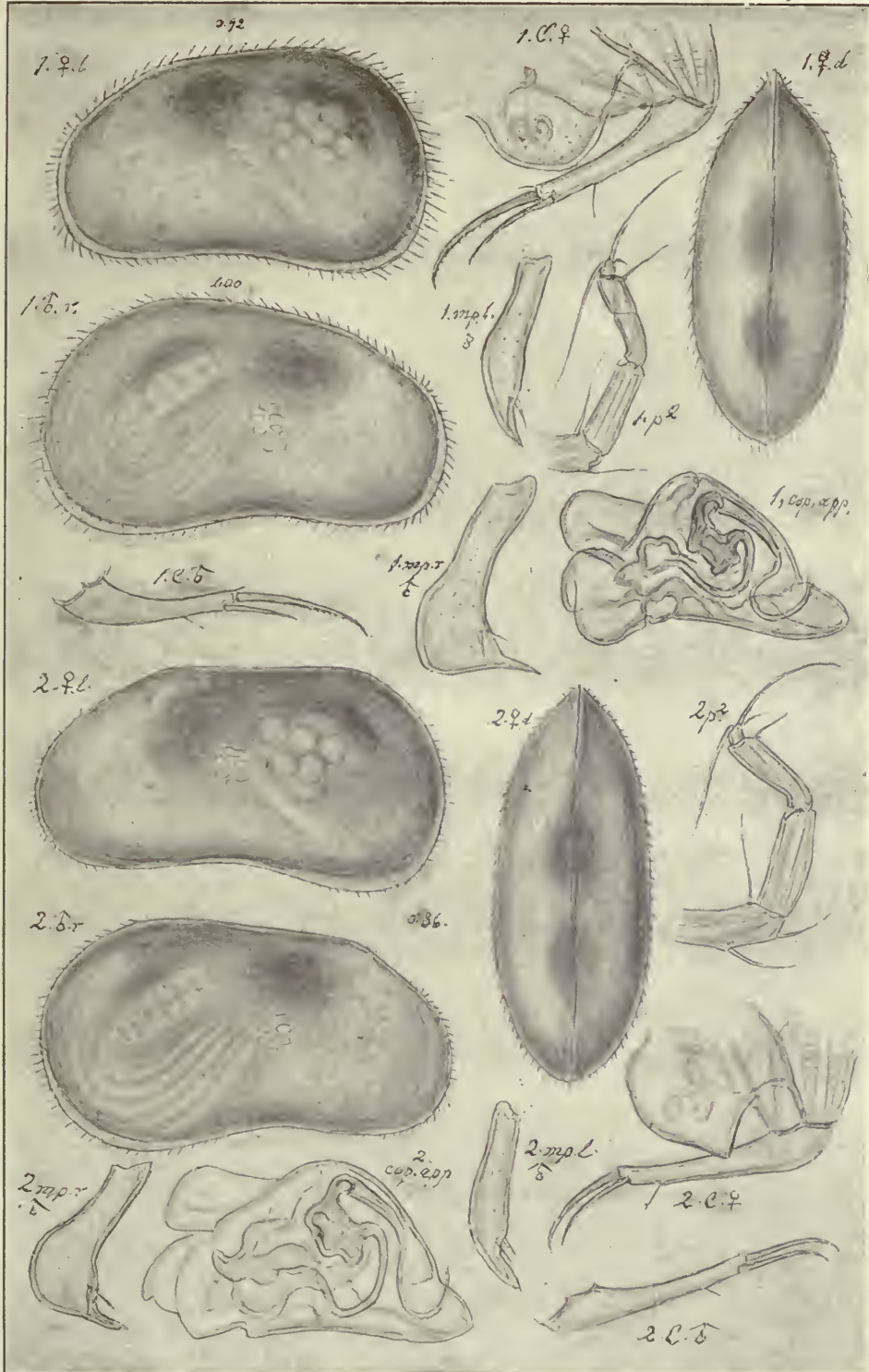


# Ostracoda

Cypridæ

Podocopa

Pl. XXXVIII



G. O. Sars del.

1. *Candona marchica*, Hartwig
2. " *stagnalis*, G. O. Sars



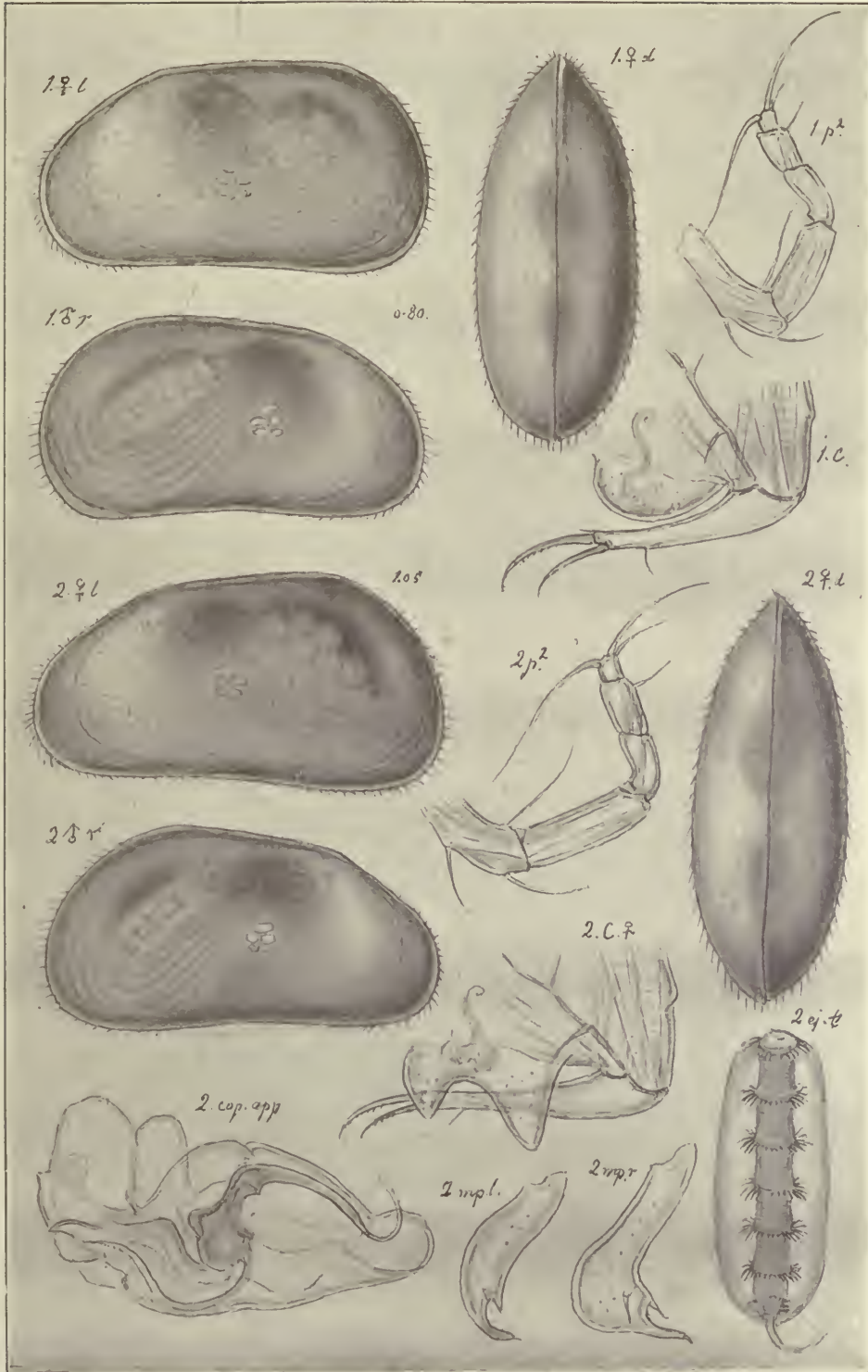


# Ostracoda

Cypridæ

Podocopa

Pl. XXXIX



G. O. Sars del.

1. *Candona albicans*, Brady
2. " *compressa*, Koch



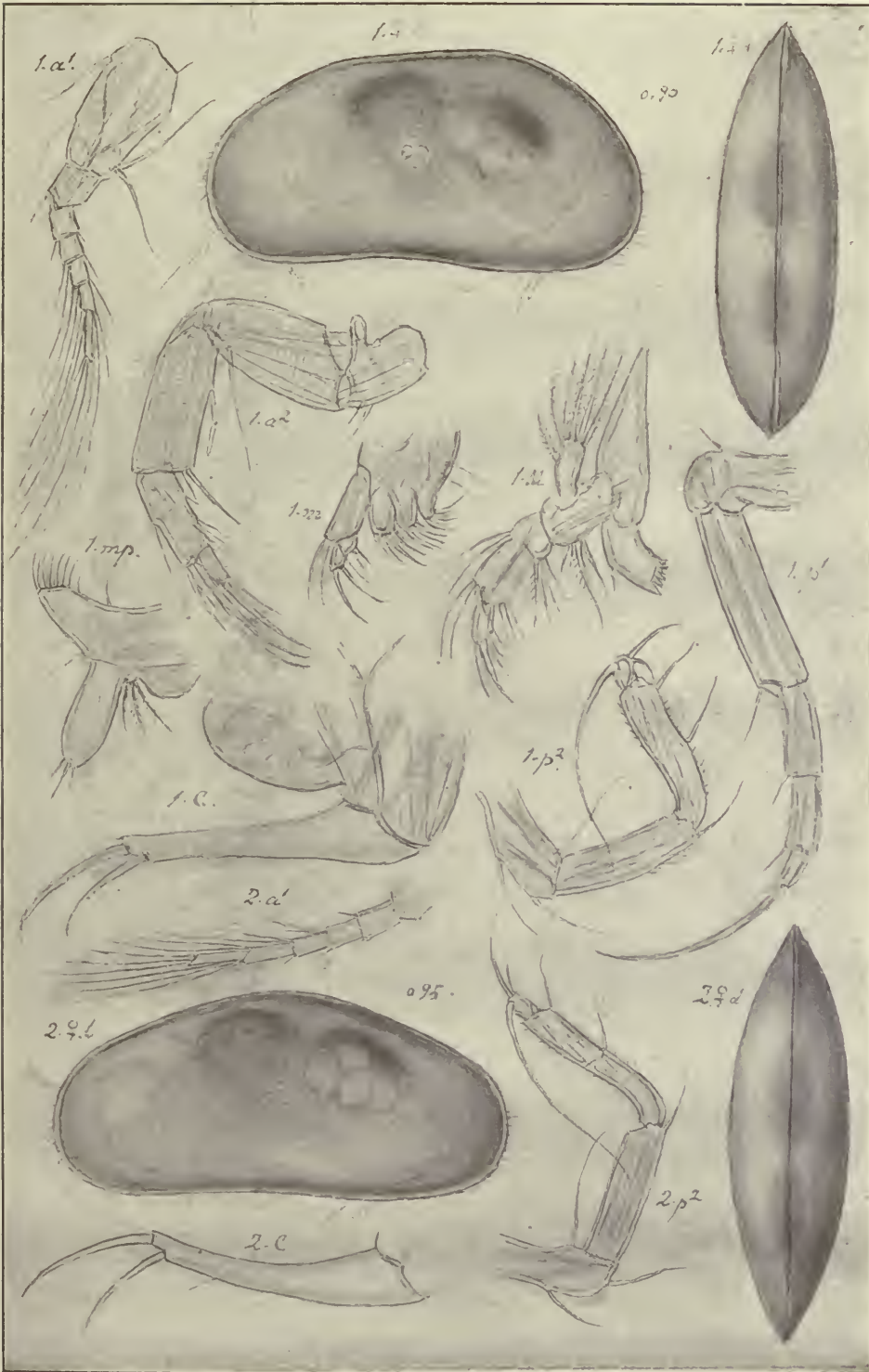


# Ostracoda

Cypridæ

Podocopa

Pl. XL



G. O. Sars del.

1. *Cryptocandona Vávrai*, Kaufmann
2.       "      *reducta*, Alm



# Ostracoda

## Podocopa

Cypridæ

Pl. XLI



G. O. Sars del.

*Candonopsis Kingsleyi*, Brady & Rob.



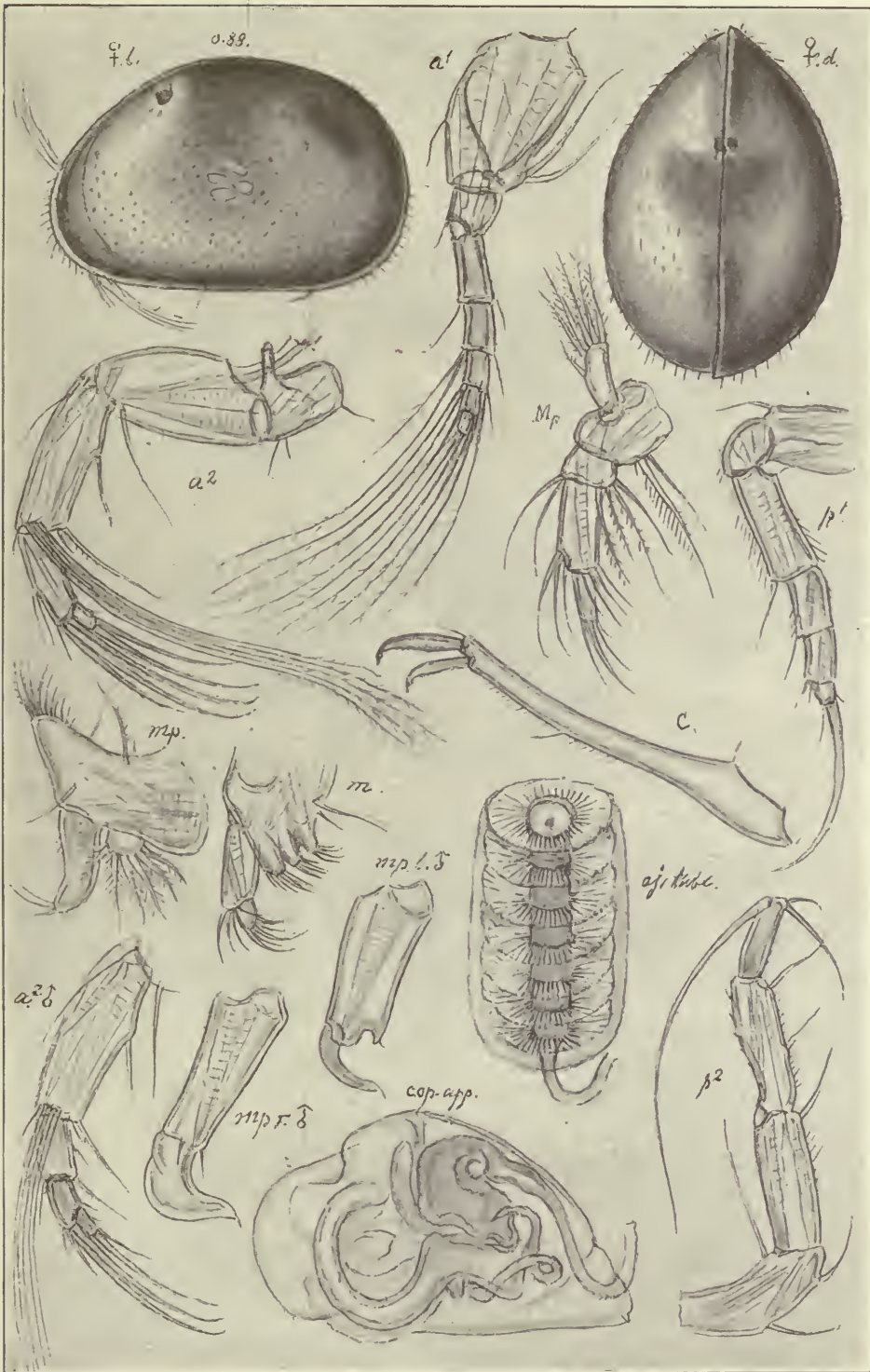


# Ostracoda

Cypridæ

Podocopa

Pl. XLII



G. O. Sars del.

*Cyclocypris globosa*, G. O. Sars



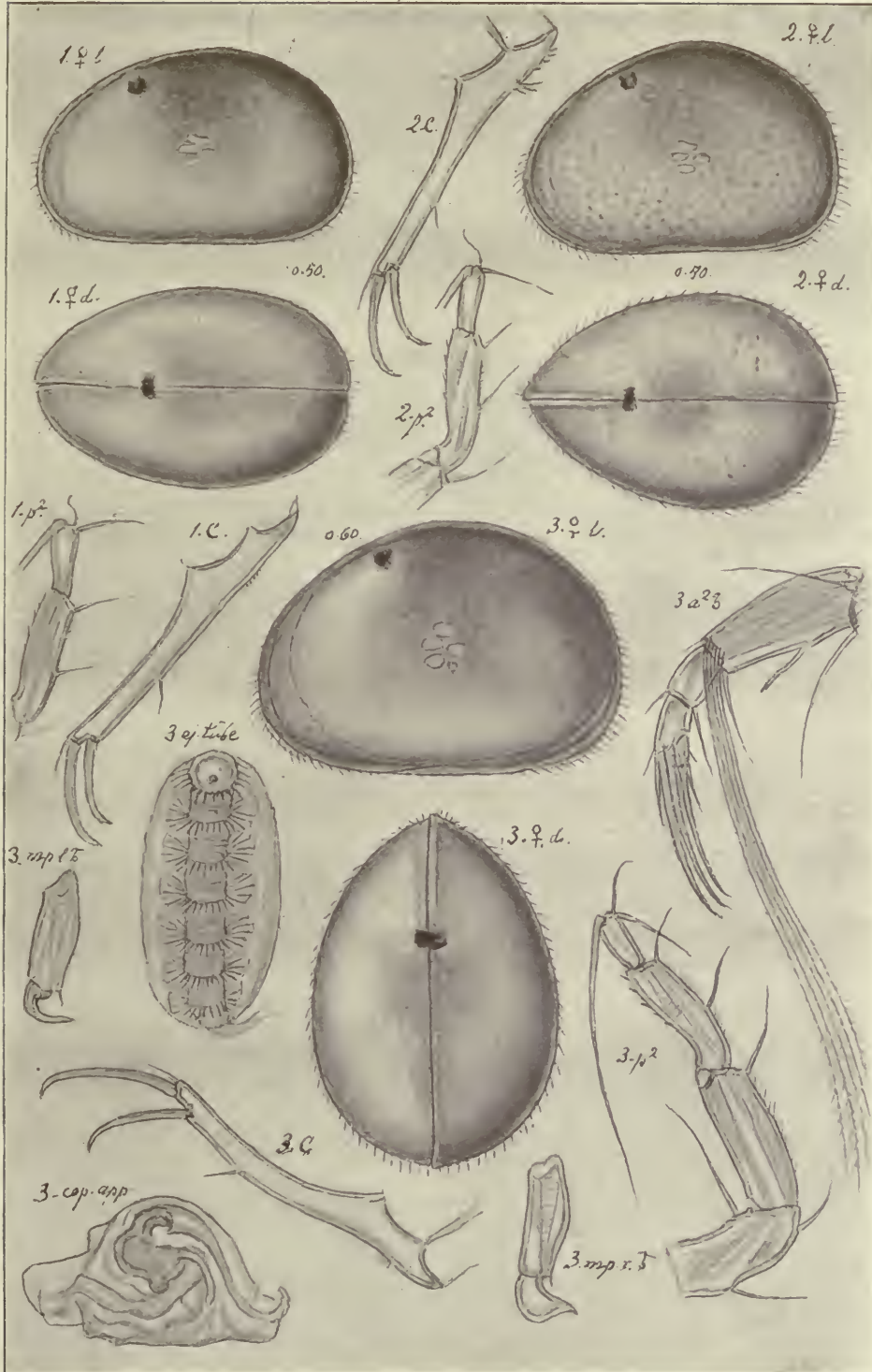


# Ostracoda

Cypridæ

Podocopa

Pl. XLIII



G. O. Sars del.

1. *Cyclocypris ovum*, (Jurine)
2.     "      *lævis*, (O. Fr. Müller)
3.     "      *serena*, (Koch)

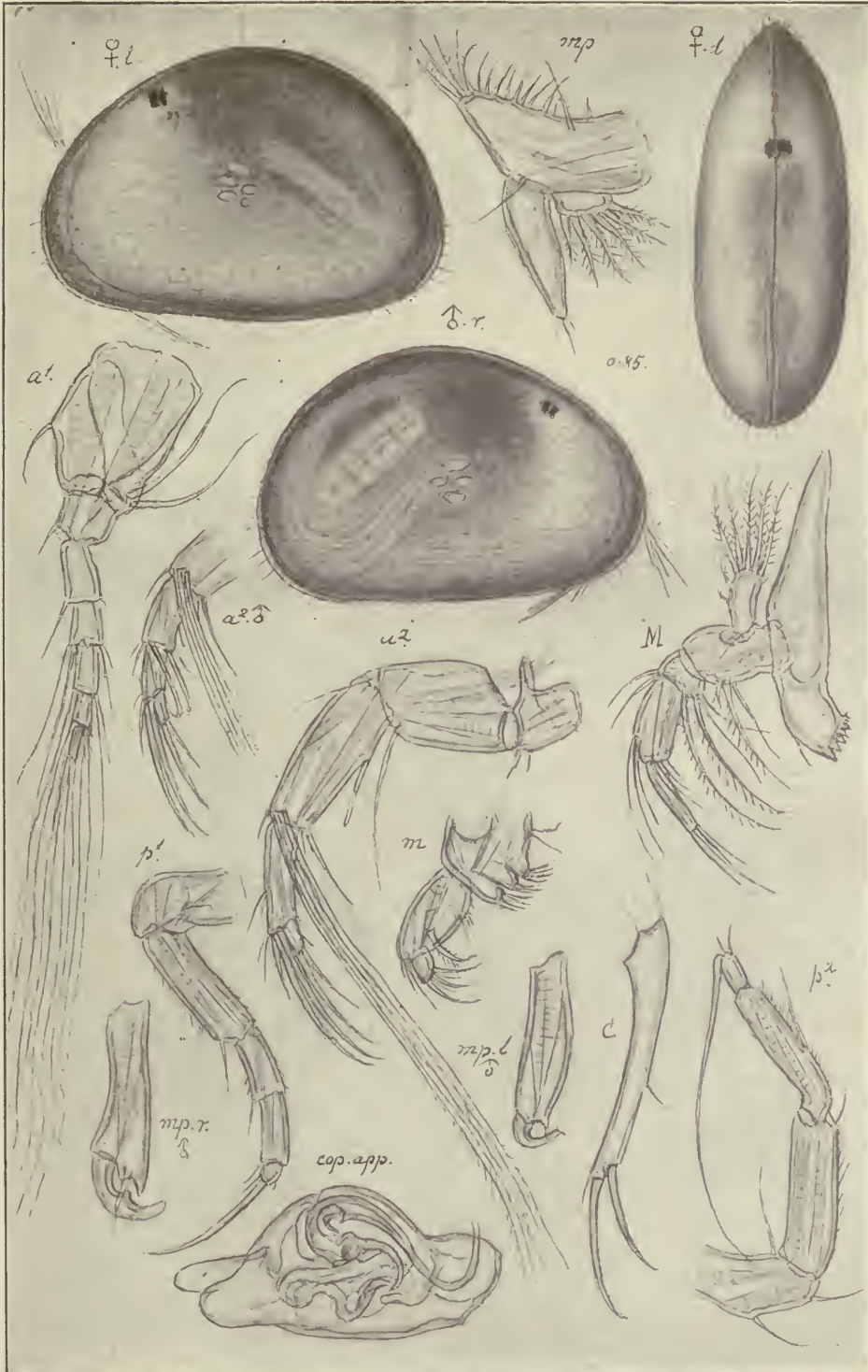


# Ostracoda

Cypridæ

Podocopa

Pl. XLIV



G. O. Sars del.

*Cyprid exsculpta*, (Fischer)



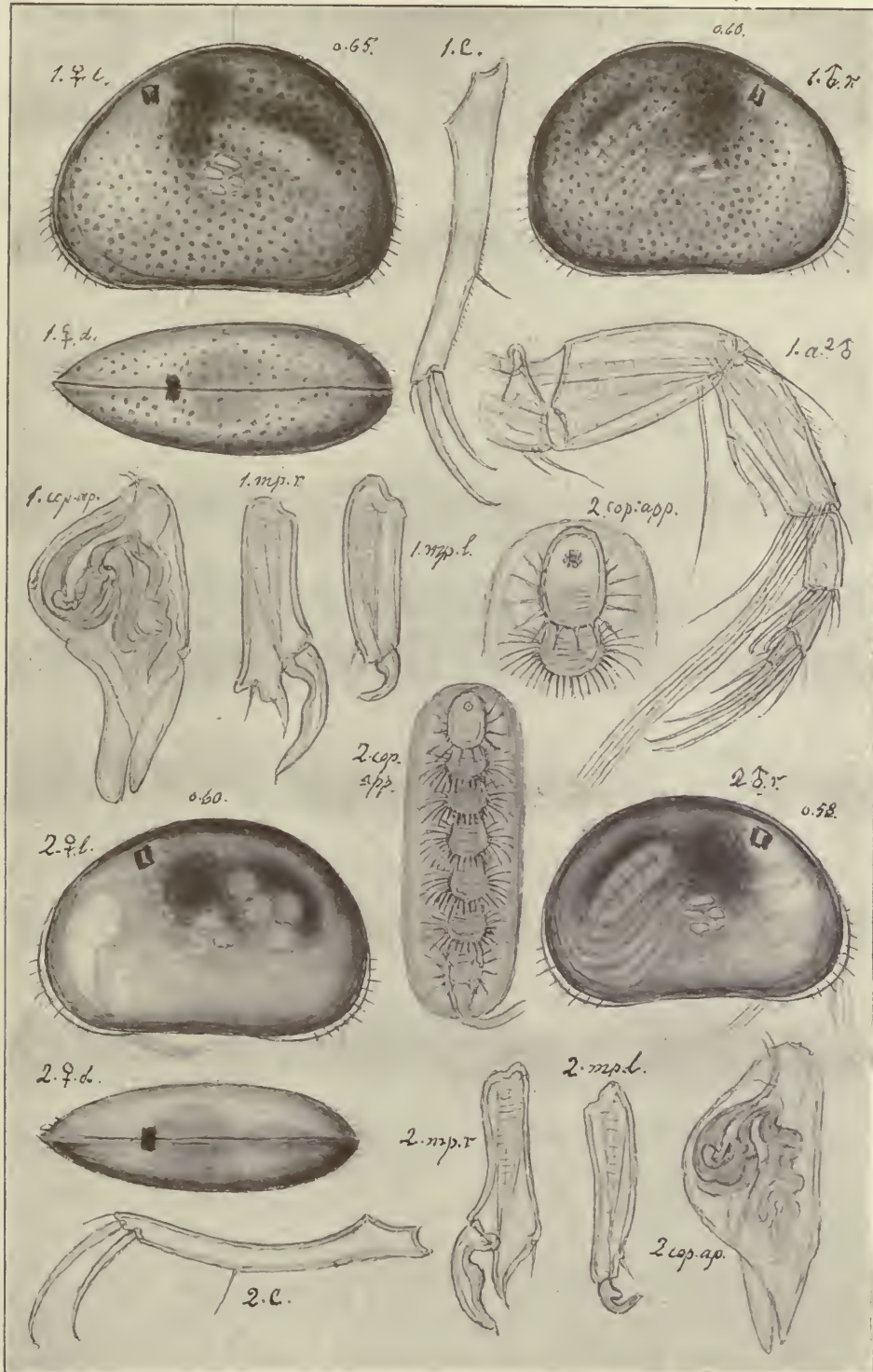


# Ostracoda

Cypridæ

## Podocopa

Pl. XLV



G. O. Sars del.

1. *Cypria ophthalmica*, (Jurine)
2. „ *lacustris*, G. O. Sars



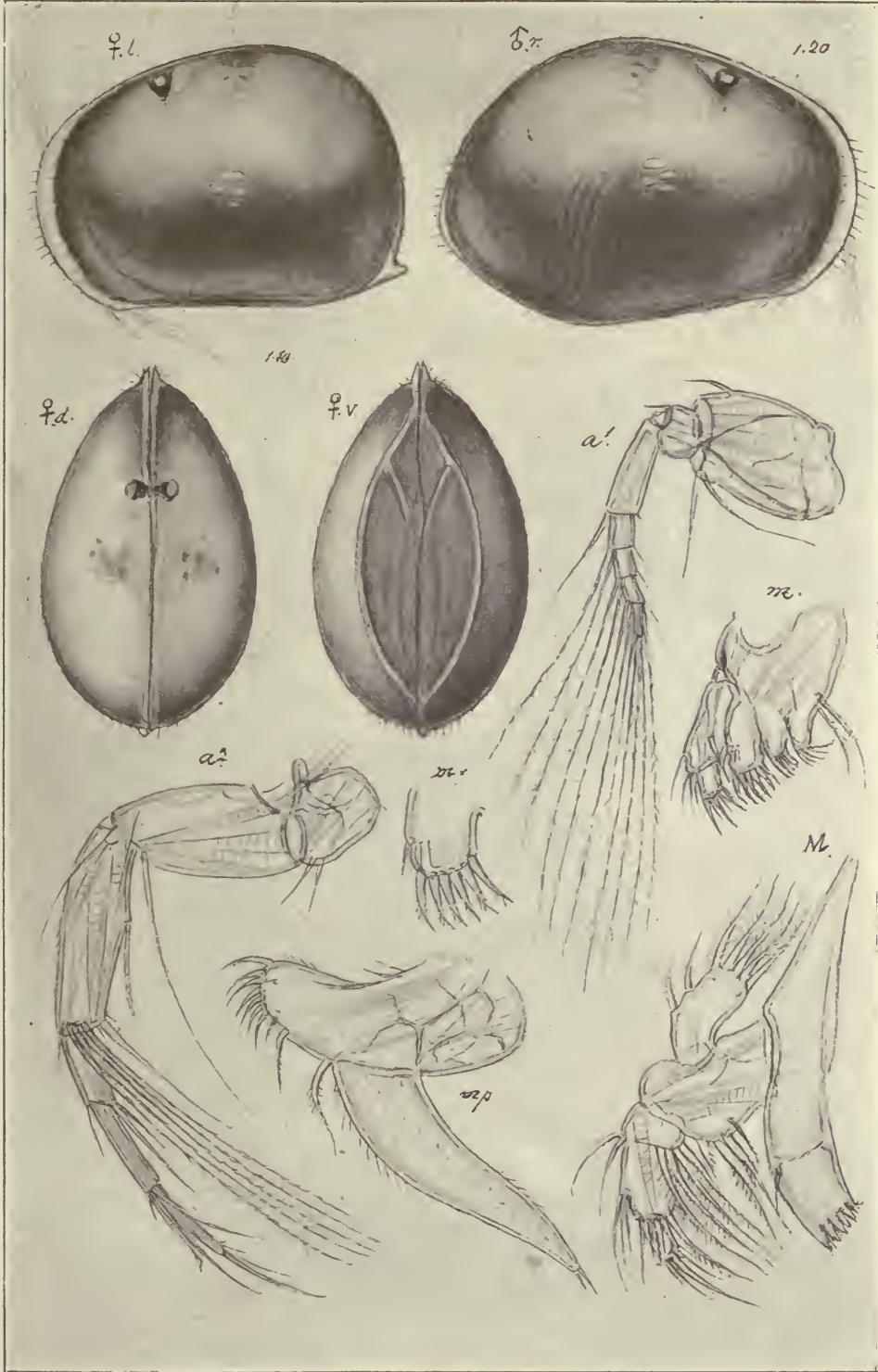


# Ostracoda

Cypridæ

Podocopa

Pl. XLVI



G. O. Sars del.

Notodromas monachus, (Jurine)  
O.F. Müller

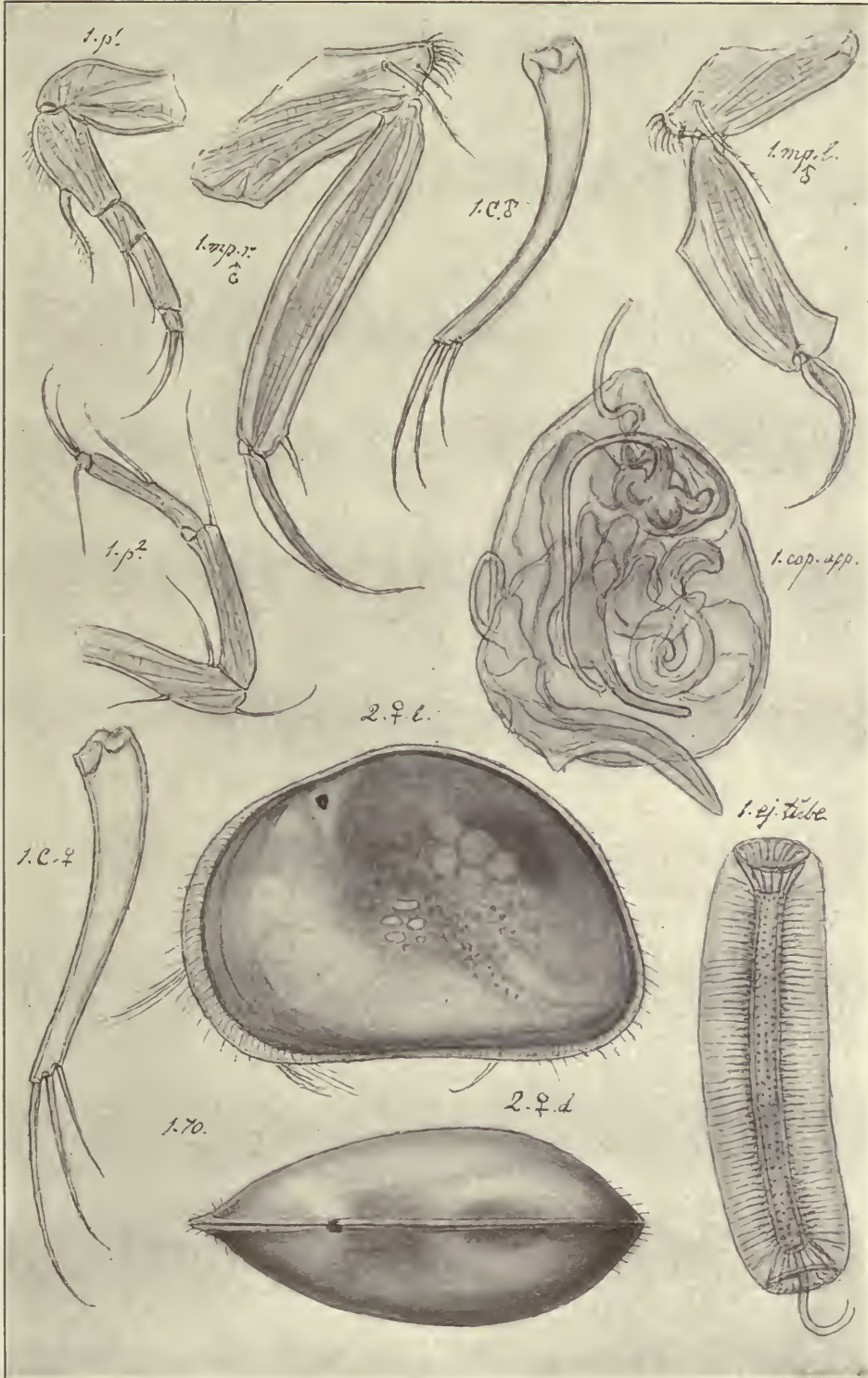


# Ostracoda

Cypridæ

Podocopa

Pl. XLVII



G. O. Sars del.

1. Notodromas monachus (continued)
2. Cyprois marginata, (Strauss)



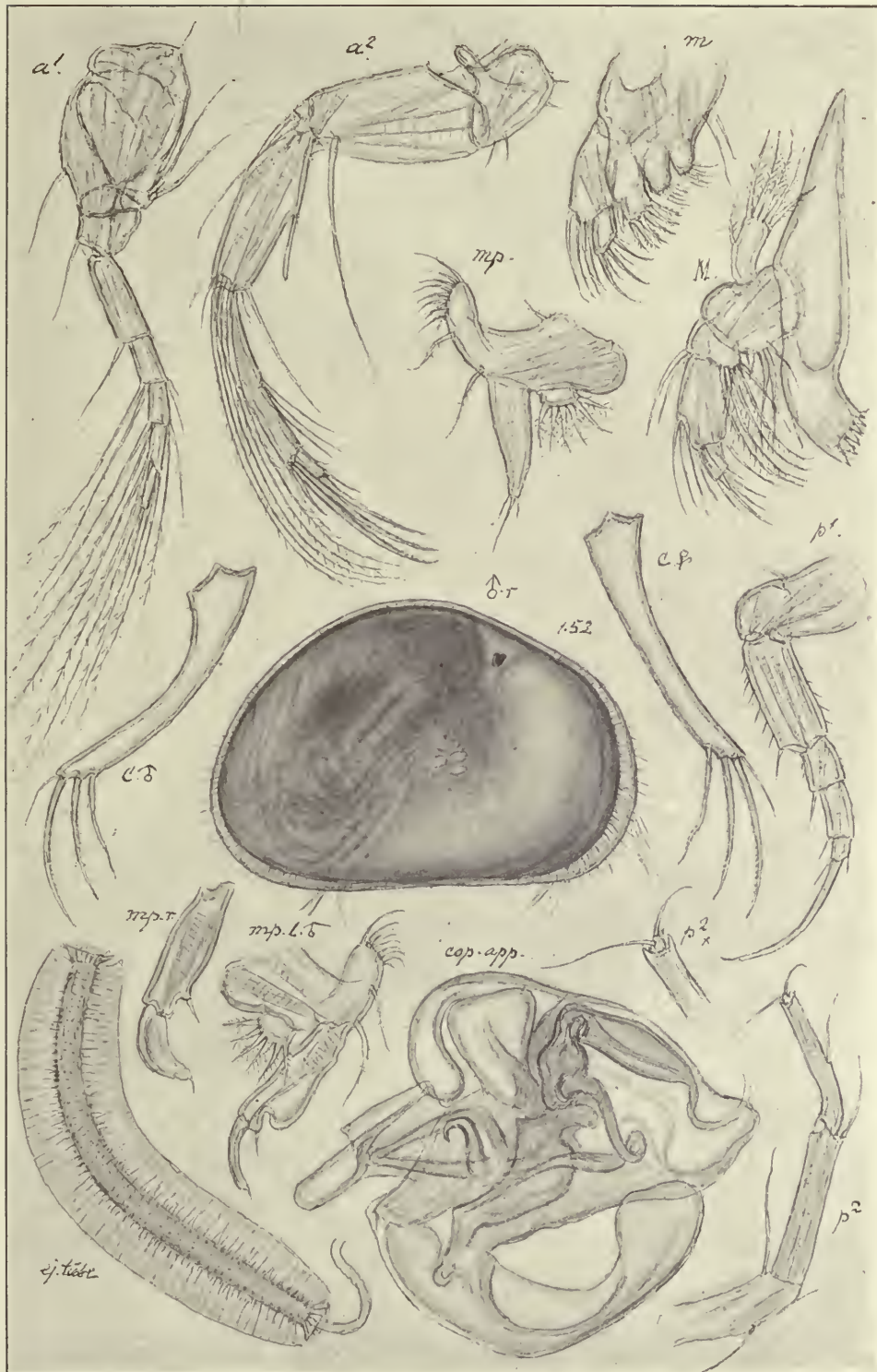


# Ostracoda

Cypridæ

Podocopa

Pl. XLVIII



G. O. Sars del.

*Cypris marginata*, (Strauss)  
(continued)



## Group 5. *Ilyocyprides*.

*Remarks.*—This group appears to be a very sharply defined one, differing, as it does, in some respects rather conspicuously from the other groups here treated of, and on this cause it has indeed by moost recent authors been considered as a distinct subfamily of the Cypridæ, *Ilyocyprinæ*. I think however that the systematic value of the above named differences has been rather overestimated, and that it might be more appropriate to regard it as merely a subsection of the subfamily Cyprinæ, as here defined. The group as yet only comprises 2 closely related genera, both of which are represented in the Fauna of Norway.

### Gen. 16. *Ilyocypris*, Brady & Norm. 1889.

*Generic Characters.*—Shell of rather firm consistency, more or less oblong quadrangular in shape, with the anterior part of the dorsal face compressed and exhibiting on each side 2 successive vertical folds, the posterior part somewhat flattened along the middle; surface of valves sculptured with numerous closely set pits, edges highly chitinated and finely denticulate, but without any pellucid border. Eye small, simple. Antennæ adapted for swimming, the natatory setæ in both pairs very long and slender. Mandibles of normal structure. Maxillæ with the masticatory lobes short and stout, none of the spines on the outermost lobe remarkably strong, palp of moderate size, with the distal joint short and broad, sub-spatulate in shape. Maxillipeds with a well defined vibratory plate at the base, palp in female very small, but distinctly biarticulate; palps in male, as usual, transformed and nearly symmetrical, both unusually slender and narrow, with the propodus not at all dilated and the dactylus rather feeble. Anterior legs of moderate size, with the penultimate and antepenultimate joints, as a rule, confluent. Posterior legs comparatively short and generally bent in a zigzag manner, penultimate joint undivided and provided inside with 2 slender setæ, terminal joint somewhat conical in shape, and carrying 3 well defined setæ, 2 of which issue from the tip, the 3rd from the outer edge of the joint. Caudal rami comparatively small, but built in the usual manner. Copulative appendages of male terminating in 2 unequal lappets, the lower one narrow cylindrical in shape, the upper rather produced and securiform expanded at the end. Ejaculatory tubes slender, with about 20 well defined whorls of radiating spikes, number of spikes in each whorl rather small; proximal end of the tubes somewhat bulbously produced.



*Remarks.*—This genus was established in the year 1889 by Brady and Norman, to include the *Cypris gibba* of Ramdohr, and has been admitted by all subsequent authors. Several additional species of this genus have in recent times been recorded both from Europe and from more southern latitudes; but some of these are so closely related, both as to the external appearance and to the structural details, that their specific validity has been often questioned. 2 such closely allied species will be described below.

### 35. *Ilyocypris biplicata* (Koch).

(Pl. XLIX).

*Cypris biplicata*, Koch, Deutschlands Crustaceen, H. 21, Pl. XVI.

Syn: *Ilyocypris gibba* var. (*auctororum*).

*Specific Characters.*—*Female.* Shell rather compressed, seen laterally, oval quadrangular in shape, somewhat higher in front than behind, greatest height in the ocular region and slightly exceeding half the length, dorsal margin nearly straight and a little sloping behind, forming a somewhat prominent convexity in the ocular region and joining the hind edge by a well-marked angular bend, ventral margin rather deeply sinuated in the middle, anterior extremity broadly rounded off, posterior obtusely blunted;—seen dorsally, narrow oblong in outline, with the greatest width scarcely exceeding  $\frac{2}{5}$  of the length and occurring behind the middle, anterior extremity obtusely pointed, posterior rounded off. Valves subequal, with the 2 vertical folds in front very conspicuous, but without any traces of projecting lateral protuberances, anterior edges very finely denticulated in their whole extent, posterior edges likewise denticulate, but with the denticles less densely crowded, both extremities moreover rather densely clothed with fine hairs. Surface of shell coarsely granular, with densely set small rounded pits. Anterior antennæ with the terminal part about the length of the basal one, joints gradually diminishing in size, setæ very long and slender. Posterior antennæ with the penultimate joint much shorter than the preceding joint, natatory setæ much elongated, extending far beyond the tips of the claws. Posterior legs with the shorter of the 2 apical setæ about half the length of the other, which equals the outer seta in size. Caudal rami slightly curved and gradually attenuated, apical claws rather thin, the distal one about half the length of the ramus, dorsal seta attached at about the outer  $\frac{1}{3}$  of the ramus.

*Male* of smaller size than female, but resembling it in the general shape of the shell. Prehensile palps of maxillipeds with the propodus not at all



dilated and carrying inside near the end a small seta, dactylus rather feeble. Copulative appendages with the lower terminal lappet very small, upper well developed, lamellar. Ejaculatory tubes with about 18 whorls of radiating spikes, proximal end rather produced, bottle-shaped.

Colour opaque whitish grey, generally with a more or less distinct brownish tinge.

Length of adult female attaining 1.10 mm.

*Remarks.*—I think I am right in identifying the form here described with that recorded by Kock under the above specific name. It has generally been combined with *I. gibba* (Ramdohr); but I find it convenient to keep it apart as a nearly allied species, since no true transitions between these 2 forms have occurred to me. The specific name proposed by Koch is fairly well applicable to the present form, the 2 transverse folds of the valves being more sharply marked off than in any other species known to me.

*Occurrence.*—I have taken this form occasionally in small ponds and ditches near Christiania. In some cases it occurred in company with *I. gibba*: but in other places only this form was met with. On the whole it would seem to be less common in our country than *I. gibba*, whereas in other countries it is by far the predominant form. In habits the animal is rather sluggish, being more generally found creeping slowly on the bottom more or less deeply buried within the loose mud. It is however by no means devoid of swimming power, as could be expected from the well-developed natatory setæ on the antennæ. Indeed, at times it is seen moving freely in the water in a peculiar abrupt manner; but these movements are never carried on for any longer time, and the animal very soon sinks back to the bottom. Evidently the heavy shell, which moreover is often thickly covered with mud, considerably encumbers the free movements of the animal. Male specimens seem to be very rare. Indeed, I have not come across this sex among the Norwegian specimens examined, nor has it been observed by any of the Swedish authors. My knowledge to the male of this species is due to some few specimens which, together with numerous females, were raised, many years ago, from dried mud taken in Algeria and kindly sent to me from Dr. Chevreux.

*Distribution.*—Throughout Europe, Algeria, North America.

36. *Ilyocypris gibba* (Ramdohr).

(Pl. L, fig. 1).

*Cypris gibba*, Ramdohr, Magaz. d. Gesellsch. naturf. Freunde zu Berlin 1808,  
Vol. II, p. 41, Pl. III.Syn: *Ilyocypris gibba* var. *bicornis*, Kaufmann.

*Specific Characters.*—*Female.* Shell resembling in general shape that of the preceding species, though perhaps a little more elongate in proportion to the height, being however highly distinguished by the presence of 3 pairs of well-marked lateral projections, especially very conspicuous in the dorsal or ventral aspect of the shell. Of the projections the one pair, located in front of the middle, is slightly umboniform, the other 2, located farther behind, are more sharply marked off, but rather unequal in size, the smaller one occurring near the ventral face, the larger more dorsally and forming a very prominent recurved horn-like process. Structure of the several limbs almost exactly as in the preceding species.

Colour whitish grey, generally lighter than in *I. biplicata*.

Length of adult female about 1 mm.

*Male* unknown.

*Remarks.*—This form was recorded as early as the year 1808 by Ramdohr as a species of *Cypris*, the specific name proposed by him alluding apparently to the peculiar gibberiform lateral projections of the shell. By Kaufmann and Masi it has been described as merely an occasional variety (*bicornis*) of the preceding species, which is regarded by them as the typical *I. gibba*. This I think cannot properly be sanctioned. In our country and also according to Dr. Alm, in Sweden the present form is much the predominant and as it unquestionably is the same as that originally observed by Ramdohr it ought in any case to be regarded as the typical *I. gibba*. In my opinion it should moreover be kept apart from the preceding form as a particular though closely allied species. True, in some cases, especially in quite young specimens, the peculiar lateral projections of the shell distinguishing the present species may appear much reduced in size; but I have never found them to be wholly absent as in the preceding species.

*Occurrence.*—This form is very common around Christiania, occurring often in great abundance in small shallow ponds and ditches with clayey bottom. In behaviour it agrees with the preceding species, though it has appeared to me to be somewhat more agile, being often seen to swim rather quickly through the water.

*Distribution.*—Throughout Europe, ? North America.

In MS. Syst. Nat.  
written *Ilyocypris*

## Gen. 17. *Iliocyprella*, Daday, 1900.

*Generic Characters*.—Shell resembling in shape that in the preceding genus, though as a rule somewhat more elongate and compressed. Valves with the 2 vertical folds in front of the middle well marked, but without any lateral projections, surface roughly granulated as in *Ilyocypris*. Antennæ not adapted for swimming, the setæ in both pairs being rather short and not ciliated. Anterior legs with the terminal part distinctly 4-articulate, the penultimate joint being sharply divided in the middle. Structure of the remaining appendages not essentially different from that in *Ilyocypris*.

*Remarks*.—This genus was proposed in the year 1900 by Daday, to include the form recorded by Vávra as *Ilyocypris gibba* var. *repens*, and was chiefly characterised by the rudimentary condition of the natatory setæ on the posterior antennæ, rendering the animal quite incapable to move freely in the water. Another well-marked difference from *Ilyocypris* is found in the distinct subdivision of the penultimate joint of the anterior legs. As generally a generic value has been assigned to both these characters, I think that the genus ought to be supported, though in other respects approaching closely to *Ilyocypris*. In addition to the species observed by Daday and described below 2 other forms recorded by Kaufmann as *Ilyocypris inermis* and *I. iners* are apparently referable to this genus.

### 37. *Iliocyprella Bradyi*, G. O. Sars.

(Pl. L, fig. 2).

*Ilyocypris Bradyi*, G. O. Sars, Oversigt af Norges Crustaceer II, p. 59.

Syn: *ilyocypris gibba* var. *repens*, Vávra.

„ *Iliocyprella repens*, Daday.

*Specific Characters*.—*Female*. Shell rather compressed, seen laterally, oblong quadrangular in shape, greatest height in front and scarcely exceeding half the length, dorsal margin perfectly straight and nearly horizontal, being only little prominent in the ocular region, ventral margin deeply sinuated, anterior extremity well rounded off, posterior obtusely blunted:—seen dorsally, narrow oblong in outline, the greatest width scarcely exceeding  $\frac{2}{5}$  of the length, anterior extremity more pointed than the posterior. Valves with the inner duplicatures very sharply defined and rather broad, borders in front and behind finely denticulated. Anterior antennæ with the terminal part scarcely as long as the basal one, none of the setæ exceeding this part in length.



Posterior antennæ with the natatory setæ reduced to slight rudiments, the longest of them scarcely extending beyond the middle of the penultimate joint. Caudal rami rather slender and scarcely at all curved, apical claws very thin, subequal, and exceeding somewhat in length half the ramus.

Colour dark brownish grey.

Length of adult female about 1 mm.

Male unknown.

*Remarks.*—This form was first described as a distinct species by the present author in the year 1890, it having previously been confounded with *Ilyocypris biplicata* (or *gibba*). The form described by Vávra in 1891 as *Ilyocypris gibba* var. *repens*, and subsequently recorded by Daday as the type of the present genus, is unquestionably identical with the species here under question.

*Occurrence.*—I have met with this form rather abundantly near Christiania, in some shallow ditches with grassy bottom and slowly floating water. The animal is rather sluggish, being quite devoid of swimming power and only adapted for slowly crawling on the bottom or along the aquatic plants growing on it. In the fresh state it is moreover easily recognised from the species of the genus *Ilyocypris* by the dark brownish colour of the shell.

*Distribution.*—Sweden, British Isles, Germany, Switzerland, Hungary, Turkistan.

## Group 6. Eucyprides.

*Remarks.*—To this group I refer the more typical forms of the subfamily Cyprinæ, all of which were formerly included in the genus *Cypris*. In recent times however several nearly-allied genera referable to this group have been established, 8 of which will be treated of in the sequel, as represented in the Fauna of Norway.

### Gen. 18. *Cypris*, O. Fr. Müller 1776 (sens. strict.).

Syn: *Eurycypris*, G. W. Müller.

*Generic Characters.*—Shell very tumid and of rather firm consistency, with the dorsal face more or less gibbously vaulted, the ventral flattened. Valves subequal, with the anterior and posterior edges in most cases coarsely dentate and the inner duplicatures moderately broad. Both pairs of antennæ powerfully developed and well adapted for swimming, the posterior ones with



the penultimate joint rather slender and attenuated, natatory setæ densely plumose and extending to the tips of the apical claws. Mandibles normally developed. Maxillæ with the masticatory lobes attenuated, the outermost one armed with 2 strong denticulated spines in addition to the usual curved bristles; palp narrow, with the distal joint cylindrical in shape. Maxillipeds with the vibratory plate well developed, palp (in female) comparatively small, not subdivided. Anterior legs remarkably short and stout, with the penultimate and antepenultimate joints wholly coalesced. Posterior legs much more slender, with only a single seta inside the penultimate joint, which terminates in several irregular lobules partly embracing the minute terminal joint; the latter provided outside with a slender seta and at the tip with a much smaller hamiform bristle accompanied inside by a knob-like projection of the joint. Caudal rami very narrow, linear in shape, with the apical claws slender and almost straight, dorsal seta small and not far remote from the tip. Propagation chiefly parthenogenetical.

*Remarks.*—In the restriction here adopted this genus only comprises a limited number of species chiefly distinguished by the coarse, ventrally flattened shell and by the structure of the anterior legs. The type of the genus is the well-known *C. pubera* O. Fr. Müller, and in Europe only one additional species, the magnificent *C. bispinosa* Lucas, has as yet been found, the other species being from more southern latitudes. Only the type species is represented in the Fauna of Norway.

### 38. *Cypris pubera*, O. Fr. Müller.

(Pl. LI).

*Cypris pubera*, O. Fr. Müller, Entomostraca p. 56, Pl. V, figs. 1—5.

Syn: *Monoculus ovatus*, Jurine.

„ *Cypris striata*, Zaddach.

„ „ *cuneata*, Baird.

„ „ *punctillata*, Brady.

„ *Eurycypris pubera*, G. W. Müller.

*Specific Characters.*—*Female.* Shell very tumid, seen laterally, oval triangular in shape, greatest height somewhat in front of the middle and considerably exceeding half the length, dorsal margin gibbously arched in its anterior part and sloping rather steeply both in front and behind, ventral margin almost straight, though slightly bowed in the oral region, anterior extremity obliquely rounded, posterior gradually narrowed, with the lower corner rounded off;—seen dorsally, broadly ovate, with the greatest width in

the middle and about equal to the height, both extremities obtusely pointed and nearly equal. Valves with the lateral faces evenly convex and all over densely clothed with comparatively short but rather coarse hairs, anterior margin of both valves armed with a row of about 8 coarse somewhat lanceolate denticles originating somewhat inside the edge; right valve moreover exhibiting at the infero-posteal corner below 2 very conspicuous successive denticles, the distal one rather long, spur-like. Armature of the valves in young specimens rather dissimilar, the anterior extremity wanting the submarginal denticles, but having the edge itself finely serrate, posterior corner of right valve with a continuous row of coarse nearly equal denticles. Anterior antennæ with the basal part very massive, terminal part a little shorter, and having the joints rapidly diminishing in size, the 1st being about as long as the 2 succeeding ones combined. Posterior antennæ with the penultimate joint fully as long as the preceding joint, but much narrower, apical claws slender and coarsely denticulated. Caudal rami exceedingly slender and narrow, perfectly straight, with the apical claws very unequal in length, the distal one being almost twice as long as the proximal one and about half the length of the ramus.

Colour dark green, in some cases with a brownish tinge, ovarian tubes shining through the shell with a bright orange hue.

Length of adult female amounting to 2.50 mm.

*Remarks.*—This form was recorded as early as the year 1776 by O. Fr. Müller under the above name, and has subsequently been observed by many other authors, though some of them did not recognise it and described it under other specific names, as seen from the above given list of synonyms. It is one of our largest freshwater Ostracods, and may moreover be easily recognised by its strongly vaulted and densely pubescent shell. The armature of the valves is also highly characteristic.

*Occurrence.*—I have taken this form rather abundantly in small ponds and swamps with grassy bottom, both around Christiania and in several other localities of our country as far North as Tjøtø on the Nordland coast. In spite of the heavy shell, the animal is well adapted for swimming, though its movements are not nearly so rapid as in most species of the next genus. Male specimens have never been met with of this species.

*Distribution.*—Throughout Europe, Siberia, North America.

Gen. 19. **Eucypris**, Vávra, 1891.

*Generic Characters*.—Shell of somewhat varying shape, but as a rule of less firm consistency than in the preceding genus, and not particularly flattened ventrally, edges of valves smooth, inner duplicatures comparatively broader than in *Cypris*. Antennæ well adapted for swimming and, like the oral parts, of a very similar structure to that in the preceding genus. Legs however, somewhat different, the anterior ones having the penultimate and antepenultimate joints well defined, and the posterior ones terminating in a more or less distinctly developed minute chela formed by a small hook-like projection of the apical joint impinging against a projecting lobule of the preceding joint. Caudal rami comparatively shorter than in the preceding genus. Propagation, as a rule, exclusively parthenogenetical.

*Remarks*.—This genus was proposed in the year 1891 by Vávra, but was taken by him, as also by most other authors, in a much wider sense than admitted in the present account. In the restriction here adopted only 6 European species are referable to this genus, 3 of which will be described below, the other 3 species not yet found in Norway being *E. ornata* (Jurine), *E. clavata* (Baird) and *E. Lilljeborgi* (G. W. Müller). In more southern latitudes, however, the genus seems to be very abundantly represented.

39. **Eucypris virens** (Jurine).

(Pl. LII).

*Monoculus virens*, Jurine, Hist. des Moncles, p. 174, Pl. XVIII, figs. 15, 16.Syn: *Cypris tristriata*, Baird." " *ornata*, Fischer (not Jurine).

*Specific Characters*.—*Female*. Shell moderately tumid, seen laterally, suboval or slightly reniform in outline, greatest height about in the middle and equal to  $\frac{3}{5}$  of the length, dorsal margin boldly arched, forming in the middle an abrupt, almost angular bend, and sloping at a nearly equal rate to each extremity, ventral margin slightly sinuated in the middle and a little bowed in the oral region, both extremities rounded off and nearly equal;—seen dorsally, oblong ovale in outline, greatest width somewhat behind the middle and about equalling half the length. Surface of valves smooth and clothed with short and fine hairs more conspicuous at each extremity; inner duplicatures of moderate size, rather broader in front than behind. Anterior antennæ with the terminal part about the length of the basal one, joints gradually diminishing in size. Posterior antennæ with the penultimate joint somewhat shorter than the preceding joint and about of equal width throughout, apical



claws slender and distinctly denticulated, natatory setæ extending to the tips of the claws. Spines on the outermost masticatory lobe of the maxillæ smooth. Palp of maxillipeds of moderate size, with the apical setæ unusually prolonged, the middle one exceeding the palp in length and distinctly ciliated in its outer part. Anterior legs moderately slender, with the terminal part distinctly 4-articulate and the apical claw rather elongated. Posterior legs with the apical chela well developed. Caudal rami almost straight and gradually attenuated, apical claws only slightly curved and rather unequal in size, the distal one considerably exceeding half the length of the ramus.

Colour dull grassy green.

Length of adult female amounting to 2.30 mm.

*Male* unknown.

*Remarks.*—The present species, the identity of which with *Monoculus virens* of Jurine seems to me to be indoubitable, may be regarded as the type of the genus *Eucypris*. It is easily distinguished from the other 2 species here described by its much larger size, as also by the rather different shape of the shell. In these respects it comes however very near to some of the exotic species described. G. W. Müller distinguishes of the present species 3 varieties or subspecies named *media*, *obtusa* and *acuminata*. Of these the 1st agrees pretty well with the Norwegian specimens observed by me; the other 2 I am much inclined to regard as particular species, having had an opportunity of examining both of them from specimens raised out of dried mud from Algeria. Young specimens of the present species, as usual, differ somewhat from the adults in the shape of the shell, and are moreover highly distinguished by a most peculiar and beautiful sculpture of the valves exactly agreeing with that described and figured by Brady in his *Cypris tessellata* (see the figures on the accompanying plate).

*Occurrence.*—This is one of our commonest freshwater Ostracoda, being found often in great abundance in grassy ponds and swamps, especially in the early part of the summer. In habits the animal is rather active and is often seen to swim about in the water with considerable speed, though as usual, more generally keeping at the bottom for search of food. Male specimens have never been met with either of this or any other species referable to the present genus in the restriction here adopted, and the exclusive partensgenitival propagation may thus be mentioned as a distinguishing character of the genus from some of the succeeding nearly allied genera.

*Distribution.*—Throughout Europe, North America, Greenland.



40. *Eucypris crassa* (O. Fr. Müller).

(Pl. LIII, fig. 1).

*Cypris crassa*, O. Fr. Müller, Entomostraca, p. 61, Pl. 6, figs. 1 & 2.Syn: *Cypris dromedaria*, Fischer.

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally, of quite an unusual shape, being somewhat gibbous in front and narrowly produced behind; greatest height anteriorly and about equalling half the length, dorsal margin forming in front a bold gibberiform curve and sloping obliquely behind, with a slight concavity above the posterior extremity, ventral margin rather deeply sinuated, anterior extremity broadly rounded off, and rather sharply defined above by a conspicuous depression in front of the ocular region, posterior much narrower and obtusely blunted at the end;—seen dorsally, regularly oblong oval, greatest width in the middle and nearly attaining half the length, both extremities remarkably contracted at the ends, which project as sharp rostriform points. Valves rather thin, with a well-marked pellucid marginal zone; inner duplicatures remarkably broad both in front and behind; surface smooth and shining. Anterior antennæ with the terminal part somewhat longer than the basal one, joints successively diminishing in size. Posterior antennæ with the penultimate joint almost as long as the preceding one, apical claws rather slender, natatory setæ not fully extending to the tips of the claws. Maxillæ with the masticatory lobes less attenuated than in the other species, palp likewise somewhat dissimilar, its distal joint being comparatively shorter and broader. Caudal rami rather strong, with the distal claw very long and slender, almost attaining the entire length of the ramus.

Colour light greenish.

Length of adult female amounting to 1.90 mm.

*Male* unknown.

*Remarks.*—This is a very distinct and easily recognisable form, differing conspicuously from any of the other known species in the shape of the shell, as also somewhat in the structure of the maxillæ, though being apparently referable to the present genus. The specific name *dromedaria*, under which it has been recorded by Fischer, alludes to the peculiar shape of the shell, as seen laterally.

*Occurrence.*—The only place where I have hitherto met with this form, is on the high-plateau of Ekeberg, near Christiania. It occurred here early in the spring very abundantly in a shallow grassy swamp, which later in the

summer becomes wholly dried up. The animals were seen swimming about in the water rather quickly in the usual manner.

*Distribution*.—Sweden (Alm), British Isles (Brady), Germany (G. W. Müller), Russia (Fischer).

#### 41. *Eucypris elliptica*, Baird.

(Pl. LIII, fig. 2).

*Cypris elliptica*, Baird, Nat. Hist. of British Entomostraca, p. 158, Pl. XIX, fig. 12.

*Specific Characters*.—*Female*. Shell rather tumid, seen laterally, oval trigonal in outline, greatest height a little in front of the middle and slightly exceeding  $\frac{2}{3}$  of the length, dorsal margin gibbously arched and sloping with an almost straight course to each extremity, ventral margin very slightly sinuated in the middle and conspicuously bowed in the oral region, both extremities evenly rounded off, the anterior somewhat broader than the posterior;—seen dorsally, oblong ovate in outline, greatest width behind the middle and slightly exceeding half the length, anterior extremity more narrowed than the posterior. Valves nearly equal, with the surface smooth and clothed with delicate hairs; inner duplicatures very narrow. Structure of the several limbs not exhibiting any noticeable peculiarity. Caudal rami of moderate length, slightly attenuated and nearly straight, though a little curved downwards at the end, distal claw about equal in length to  $\frac{2}{3}$  of the ramus.

Colour light yellowish green.

Length of adult female amounting to 1.50 mm.

*Male* unknown.

*Remarks*.—I think that G. W. Müller was quite right in identifying the form examined by him with *Cypris elliptica* Baird. At least the figures given by Brady and Norman of this form seems to me to agree pretty well with the present species, and I am by no means prepared to assent with Dr. Alm in his opinion that these figures are more properly applicable to *Eucypris affinis hirsuta* of that author, which belongs to the next genus, *Cypricercus*. True, a certain resemblance between these 2 forms may be found in the shape of the shell, as seen laterally; but the dorsal aspect is conspicuously different, and the figure given by Brady and Norman in this aspect agrees perfectly with that here reproduced.

*Occurrence*.—I have only once met with this species, viz., some years ago in a small pond near Christiania. At first I indeed thought it to be a large variety of *Cypricercus offinis* (see further on), to which it bears a per-

plexing similarity both in its general appearance and in its behaviour. I very soon however became convinced of the fundamental difference of these 2 forms.

*Distribution*.—Sweden (Alm), British Isles (Brady), Germany (G. W. Müller).

## Gen. 20. **Cypricercus**, G. O. Sars, 1895.

*Generic Characters*.—Shell tumid, of more or less elliptical shape, higher in front than behind, with the left valve overlapping the right more or less conspicuously along the anterior extremity. Antennæ well adapted for swimming, the posterior ones unusually slender and attenuated. Mandibles normal. Maxillæ with both the palp and the masticatory lobes narrowly produced. Maxillipeds with the vibratory plate well developed, palp in female of the usual lash-shaped appearance; those in male slightly unequal. Anterior legs of moderate length. Posterior legs with the terminal joint very small, apical bristle unguiform curved. Caudal rami long and slender, attached to the body by a very mobile jointing. Copulative appendages of male terminating in 2 unequal lappets, the lower rounded, the upper very prominent, beak-shaped. Ejaculatory tubes slender, with numerous whorls of radiating spikes, proximal extremity cup-shaped. Spermatic vessels forming within the anterior part of each valve a dense spiral coil.

*Remarks*.—This genus was established by the present author in the year 1895, to include a South African species, *C. cuneatus* G. O. Sars, and was chiefly characterised by the powerfully developed caudal rami and by the peculiar arrangement of the spermatic vessels of the male. It is nearly allied to the genus *Strandesia* of Claus (*Neocypris* G. O. Sars), and indeed G. W. Müller has combined the 2 into one, though in my opinion they ought to be kept apart. I have felt justified to include in the present genus the 4 succeeding Norwegian species, which by recent authors have been referred to the genus *Eucypris*. True, one of the most characteristic feature of this genus, viz., the peculiar arrangement of the spermatic vessels, has not been stated, because in none of them as yet male specimens have been met with. But in a closely allied species from Algeria I have succeeded in examining that sex, and have found the above named character perfectly as in the type species. The remarkable development of the caudal rami is in all of them in full accordance with that in the South African species.



42. *Cypricercus fuscatus* (Jurine).

(Pl. LIV).

*Monoculus fuscatus*, Jurine, Hist. des Monocles, p. 174, Pl. 19, figs. 1, 2.Syn: *Cypris hispida*, Baird." — *adusta*, Koch." — *fusca*, Brady." *Eucypris fuscata major*, G. W. Müller.

*Specific Characters.*—*Female.* Shell, seen laterally, oval or elliptical in shape, greatest height a little in front of the middle and somewhat exceeding half the length, dorsal margin rather evenly arched, ventral not at all sinuated, curving somewhat upwards behind, anterior extremity broadly rounded off, posterior much narrower and terminating in an obtuse corner;—seen dorsally, broadly ovate in outline, greatest width nearly equal to the height, anterior extremity more pointed than the posterior. Valves somewhat less unequal than in most of the other species, though the left one overlaps the right a little along the anterior extremity, surface rather densely hairy and somewhat uneven by numerous small knobs, from which the hairs arise; inner duplicatures not very broad. Posterior antennæ very slender and attenuated, natatory setæ extending about to the ends of the terminal claws. Spines on the outermost masticatory lobe of the maxillæ coarsely denticulated in their outer part. Caudal rami exceedingly slender and narrow, distal claw scarcely attaining half the length of the ramus.

Shell of a light yellowish brown hue, with a very conspicuous dark chocolate brown band across the nuchal region, extending obliquely down the sides of the valves to somewhat beyond the muscular spots.

Length of adult female amounting to 1.50 mm.

*Male* unknown.

*Remarks.*—The identity of the above described form with Jurine's *Monoculus fuscatus* seems to me to be undoubitable, and I should also be much inclined to believe that *Cypris adusta* of Koch is the same species. Brady and Norman moreover quote *Cypris hispida* Baird as a synonym. It is the largest of the Norwegian species, and may moreover be easily recognised by the characteristic colour of the shell, which even in specimens for a longer time preserved in alcohol is well observable.

*Occurrence.*—The only locality where I have hitherto met with this form, is on Mærdø, outside Arendal. It occurred here very abundantly in small water-holes peopled with larvæ and youngs of *Limnadia lenticularis*.

*Distribution.*—Throughout Europe, North America.



43. *Cypricercus affinis* (Fischer),

(Pl. LV, fig. 1).

*Cypris affinis*, Fischer, Mem. Acad., St. Petersburg, Vol. 7, p. 32, Pl. X, figs. 9--11.Syn: *Cypris reticulata*, Zaddach.„ — *fuscata minor*, G. W. Müller.„ *Eucypris fuscata affinis*, G. W. Müller.„ — *affinis hirsuta*, Alm.

*Specific Characters.—Female.* Shell, seen laterally, oval or somewhat club-shaped in outline, greatest height considerably exceeding half the length, dorsal margin somewhat gibbously arched in front of the middle and sloping with an almost straight course both in front and behind, ventral margin very slightly sinuated in the middle and gently curved upwards behind, anterior extremity well rounded off, posterior rather narrower and obtuse at the end; —seen dorsally, regularly oval in outline, with the greatest width about equal to the height, both extremities obtusely pointed. Valves more unequal than in *C. fuscata*, the left one considerably overlapping the right along the anterior extremity; surface smooth and clothed with delicate hairs; inner duplicatures comparatively broader than in the preceding species. Natatory setæ of the posterior antennæ extending somewhat beyond the apical claws. Spines on the outermost masticatory lobe of the maxillæ indistinctly denticulated. Caudal rami of the structure characteristic of the genus, but somewhat less slender than in the preceding species, distal claw attaining half the length of the ramus.

Colour light yellowish, with a slight olivaceous tinge, and without any sharply marked dark patches.

Length of adult female amounting to 1.20 mm.

*Male* unknown.

*Remarks.*—The specific name *reticulata* proposed by Zaddach and assigned by some recent authors to this species must, I think, be wholly discarded, as only applying to immature specimens, and I have shown above, that the *Cypris tessellata* Fisher is of a similar kind, being in all probability only founded on immature specimens of *Eucypris virens*. It remains to consider the 2 species described by Fischer as *Cypris affinis* and *C. hirsuta*, which both are unquestionably referable to the present genus. These 2 species have by most recent authors been combined and only regarded as varieties of one species, which is named by Dr. Alm *Eucypris affinis-hirsuta*. I have however convinced myself that these 2 forms are in reality specifically distinct, and that of course the 2 names proposed by Fischer ought to be supported in the sense originally taken by that author. To the present species the specific

name *affinis* ought to be fixed, whereas the next species must bear the name *hirsuta*.

*Occurrence*.—This form is rather common around Christiania in small ponds and ditches, but is as a rule only met with in the early part of the summer. The animals are very active, swimming about in the water rather quickly.

*Distribution*.—Throughout Europe, North America.

#### 44. *Cypricercus hirsutus* (Fischer).

(Pl. LV, fig. 2).

*Cypris hirsuta*, Fischer, l. c. p. 159, Pl. 10, figs. 6—8.

Syn: *Cypris elliptica*, G. O. Sars (not Baird).

„ ? *Eucypris affinis-hirsuta*, Alm (part).

*Specific Characters*.—*Female*. Shell conspicuously less high than in the preceding species, seen laterally, oblong oval in shape, with the greatest height scarcely exceeding half the length, dorsal margin gently arched, without showing any gibbous bend in front, ventral margin distinctly sinuated in the middle and somewhat bowed in the oral region, anterior extremity well rounded off, posterior narrowed and obtuse at the end;—seen dorsally, broadly oval in outline, with the greatest width exceeding the height, both extremities obtuse and subequal. Valves conspicuously unequal, the left overlapping the right considerably along the anterior extremity; surface rather densely hairy. Natalory setæ of the posterior antennæ not extending as far as the apical claws. Spines of the outermost masticatory lobe of the maxillæ smooth. Caudal rami comparatively more slender than in the preceding species, distal claw not attaining half the length of the ramus.

Colour dark bluish green.

Length of adult female scarcely exceeding 1.10 mm.

*Male* unknown.

*Remarks*.—I think I am right in identifying the above-described form with *Cypris hirsuta* of Fischer. It was formerly erroneously regarded by me as identical with *Cypris elliptica* Baird, which has proved to belong to the preceding genus (see above). Dr. Alm does not however admits its specific difference from *C. affinis*, combining both under the name *Eucypris affinis-hirsuta*. I think however that its distinction may be found in reality to be beyond doubt, as it differs from the preceding species, both in the shape of the shell and in the structure of the appendages, as also very conspicuously in colour.

*Occurrence*.—I have taken this form in several places, both near Christiania and elsewhere in the country, in small ponds and ditches with muddy bottom. In habits it differs notably from the preceding species, being by far not so active, as could indeed be inferred from the less fully developed natatory setæ on the posterior antenna. More generally the animals keep close to the bottom, over which they are seen mowing rather slowly, very seldom ascending to the surface.

*Distribution*.—? Sweden (Alm), Russia (Fischer), probably also in many other parts of Europe.

#### 45. *Cypricerius obliquus* (Brady).

(Pl. LV, fig. 3).

*Cypris obliqua*, Brady, Monogr. of British Ostracoda, p. 364, Pl. XXIII, figs. 33—38.

*Specific Characters*.—*Female*. Shell, seen laterally, of the usual oval shape, greatest height a little in front of the middle and considerably exceeding half the length, dorsal margin rather boldly and evenly arched, ventral very slightly sinuated in the middle and curving upwards both in front and behind, both extremities rounded off, the anterior more broadly than the posterior;—seen dorsally, regularly ovate in outline, with the greatest width in the middle and not fully attaining the height, both extremities gradually narrowed and terminating in an obtuse point;—end view remarkably oblique, the right valve being in a higher level than the left. Natatory setæ of the posterior antennæ extending about to the tips of the apical claws. Spines of outermost masticatory lobe of maxillæ indistinctly denticulated in their outer part. Caudal rami very slender, distal claw not nearly attaining half the length of the ramus.

Colour light greenish.

Length of adult female amounting to 1.26 mm.

*Male* unknown.

*Remarks*.—This form was described by Brady in his well-known Monograph and chiefly characterised by the peculiar oblique shape of the shell, as seen from the ends. In the lateral aspect it does not look very different from that of *C. affinis*, though on a closer comparison some slight differences may be found also in this case. The specific distinctness of this form is however quite unquestionable.

*Occurrence*.—I have taken this form, often in great abundance, both near Christiania and in several other places of our country, and always only at the borders of larger lakes, never in such small ponds and ditches, which are



peaped by the other species of this genus. It is very perplexing that this form has not yet been recorded from Sweden, the Ostracod Fauna of which has been so thoroughly investigated both by earlier and recent authors. Probably it has been overlooked, owing to its external resemblance to *C. affinis*.

*Distribution*.—British Isles (Brady), France (Monier).

## Gen. 21. *Cyprinotus*, Brady, 1885.

*Generic Characters*.—Shell compressed, more or less gibbously arched dorsally, with the valves conspicuously unequal, the left overlapping the right anteriorly and also somewhat dorsally, right valve with the free edges in their whole extent minutely tuberculated. Antennæ well adapted for swimming and, like the mandibles, of normal structure. Maxillæ with the masticatory lobes less attenuated than in the preceding genus. Maxillipeds and legs about as in that genus. Caudal rami however far less powerfully developed. Copulative appendages of male resembling in shape those in *Cypricercus*. Ejaculatory tubes with numerous whorls of radiating spikes, proximal extremity truncate.

*Remarks*.—This genus was established in the year 1885 by Brady, to include a Ceylon species *C. cingalensis*, distinguished by a most unusual dorsal gibbosity of the shell. Two Australian species, with the dorsal gibbosity of the shell less strongly marked, but otherwise agreeing with the type, were subsequently described by the present author, one of them, *C. dentato-marginatus*, having previously been recorded by Brady from India as a species of *Cypris*. The 2 Northern species described below are unquestionably referable to the present genus in the restriction here adopted.

### 46. *Cyprinotus salinus* (Brady).

(Pl. LVI, fig. 1).

*Cypris salina*, Brady, Monograph of British Ostracoda, p. 368, Pl. XXVI, figs. 8—13.

Syn: *Cypris strigata*, Baird (not O. Fr. Müller).

„ „ *prasina*, Brady & Norm. (not Fischer).

„ *Eucypris palermitana*, Daday.

*Specific Characters*.—*Female*. Shell, seen laterally, broadly oval in shape, greatest height in the middle and almost attaining  $\frac{2}{3}$  of the length, dorsal margin boldly arched, ventral slightly sinuated, anterior extremity somewhat deflexed and obliquely rounded, posterior conspicuously produced, forming below a rounded expansion defined above by a slight concavity of the dorsal margin;—seen dorsally, oblong ovate in outline, with the greatest width behind



the middle and scarcely attaining half the length, anterior extremity gradually narrowed to an acute point, posterior obtuse. Valves conspicuously unequal, the left one overlapping the right in their greater extent; marginal tubercles of right valve very small and densely crowded; surface of shell smooth and clothed with short and delicate hairs. Anterior antennæ with the terminal part scarcely exceeding the basal one in length, joints successively diminishing in size. Posterior antennæ with the penultimate joint about equal in length to  $\frac{2}{3}$  of the preceding one; natatory setæ extending to the tips of the apical claws. Caudal rami comparatively small, nearly straight, and gradually attenuated towards the end; distal claw exceeding half the length of the ramus.

Ground colour of the shell pale yellowish, but clouded with a number of very conspicuous dark brown band-like patches, partly surrounding the valves, partly extending down their sides, so as to leave 3 lighter vertical areas, the middle one joining below a 4th horizontal area.

Length of adult female 1.25 mm.

*Male* unknown.

*Remarks.*—This form was described as early as the year 1866 by Brady as a species of the genus *Cypris*. It is however unquestionably referable to the genus *Cyprinotus*, in the restriction here adopted, being closely allied to the southern species, *C. dentato-marginata* mentioned above. When examined in the fresh state, this form may be at once recognised by the peculiar colouring of the shell, which is unlike that in any of the other known Ostracoda.

*Occurrence.*—I have met with this form in 2 localities of our country, viz., at Sandviken, west of Christiania, and at Vallø, on the western border of Christiania Fjord. In both localities it occurred in pronouncedly brackish water, and it has also elsewhere only be found under similar conditions. The animals are rather active, swimming quickly about in the water.

*Distribution.*—Sweden (Alm), British Isles (Brady), Pommeria (Müller), France (Monier).

#### 47. *Cyprinotus fretensis* (Brady).

(Pl. LVI, fig. 2).

*Cypris fretensis*, Brady & Robertsen, Ann. Mag. Nat. Hist., Ser. IV, Vol. VI, p. 13, Pl. IV, figs. 7—9.

*Specific Characters.*—*Female.* Shell very like in its general appearance that of the preceding species, though comparatively less high, with the dorsal margin more evenly arched and the infero-posteal corner less produced.

Structure of the several appendages scarcely exhibiting any more pronounced differences from that in *C. salinus*.

Colour of the shell however very dissimilar, being uniformly light yellowish, without any traces of the dark band-like patches adorning the shell of that species.

Length of adult female scarcely exceeding 1.20 mm.

*Male* unknown.

*Remarks.*—The above-characterised form so closely resembles the preceding one, both in the general shape of the shell and in the structure of the several appendages, that its specific distinctness might look somewhat questionable, and indeed in his more recent publications Brady has withdrawn the species, finding it undistinguishable from *C. salinus*. Yet, I think that these 2 forms ought to be kept apart, as they differ very conspicuously in the colour of the shell, as also notably in habitat. On a closer comparison moreover some slight differences are found to exist in the shape of the shell, as seen laterally.

*Occurrence.*—I have only met with this form in a single locality, viz., in a ditche near Moss, where it occurred rather abundantly together with other Entomostraca. The water in the ditch was perfectly fresh, and as the situation of the ditch is considerably above the level of the sea, no mixture of salt water can ever have taken place. Brady has found it under quite similar conditions.

*Distribution.*—British Isles (Brady).

## Gen. 22. **Heterocypris**, Claus, 1892.

*Generic Characters.*—Shell moderately tumid and more or less reniform in shape, with the dorsal face not gibbously arched; its colour in all the known species uniformly yellow. Valves conspicuously unequal, the left one being the larger, and overlapping the right anteriorly as also somewhat ventrally; edges of right valve roughly tuberculated along the anterior extremity and along the posterior part of the ventral side. Structure of the several appendages rather like that of the preceding genus.

*Remarks.*—This genus was proposed in the year 1892 by Claus, to include the well known European species *Cypris incongruens* Ramdohr. It has however not been admitted by subsequent authors, who regard it as identical with the genus *Cyprinotus* of Brady, to which it certainly shows a close affinity. Yet, I find it appropriate to keep these 2 genera apart, as they differ conspicuously in the shape and partly also in the structure of the shell. More-

over in recent times several additional species, closely agreeing with the type of the present genus, and exhibiting the very same differences from *Cyprinotus*, have been detected. To the Norwegian Fauna only belongs a single species, to be described below.

#### 48. *Heterocypris incongruens* (Ramdohr).

(Pl. LVII).

*Cypris incongruens*, Ramdohr, Magazin. naturf. Freunde in Berlin, 2 Jahrg. 1808, p. 86, Pl. III, figs. 1—12, 15—20.

Syn: *Monoculus aurantius*, Jurine.

„ *Cypris fusca*, Strauss.

„ *Cyprinotus incongruens*, G. O. Sars.

„ *Eucypris incongruens*, Daday.

*Specific Characters.*—*Female*. Shell, seen laterally, oval subreniform in shape, distinctly higher behind than in front, greatest height not fully attaining  $\frac{2}{3}$  of the length, dorsal margin sloping gradually in front and quite evenly arched behind, ventral margin very slightly sinuated in front of the middle, anterior extremity somewhat obliquely rounded, posterior obtuse, with the lower corner not at all produced;—seen dorsally, oblong-ovate in outline, with the greatest width behind the middle and about equal to half the length, anterior extremity gradually narrowed to an acute point slightly turned to left side, posterior obtuse. Surface of shell smooth and polished, with scattered small puncta and clothed with short and delicate hairs; left valve overlapping the right in front by a well-marked pellucid border wanting on the right valve, marginal tubercles of the latter obtusely rounded and in some cases not easy to discern, though apparently never wholly absent. Anterior antennæ with the terminal part about the length of the basal one, its 1st joint fully as long as the 2 succeeding ones combined. Posterior antennæ with the penultimate joint much shorter than the preceding one, natatory setæ extending somewhat beyond the tips of the apical claws. Caudal rami rather narrow and nearly straight, distal claw about half the length of the ramus, dorsal seta rather longer than the apical one.

Colour pale yellow, in older specimens passing over to an orange hue, ripe ova shining through the shell with a brick-red colour.

Length of adult female amounting to 1.60 mm.

? *Male* unknown.

*Remarks.*—This form was recorded as early as the year 1808 by Ramdohr, and has subsequently been observed by almost every one of the authors who have studied the fresh water Ostracoda, though described under several



other names. When examined in the fresh state, it may at once be recognised from the other indigenous Cypridæ by the bright yellow colour of the shell, and the same characterising colouring is also found in all the other known species of the present genus.

*Occurrence.*—This is perhaps the most common of our fresh water Ostracoda, occurring often in great abundance in ponds and ditches during the greater part of the year. Though more generally keeping at the bottom, the animals are at times seen swimming about in the water with great dexterity. The exclusive parthenogenetical reproduction of this form seems to me to be indubitable. I have examined immense numbers of specimens, both from Norway and from abroad, but have never come across even a single male specimen, and I have also watched the species in my aquaria for many successive generations with the very same result. True, Dr. Vårre describe what he believe to be the male of this form; but I am by no means assured that the specimen examined by him had in reality belonged to the present species. In some other species more or less closely allied to the present one, are indeed male specimens not rarely met with, and I have examined this sex in both of the 2 South African forms; *H. capensis* (G. W. Müller) and *H. anrea* G. O. Sars.

*Distribution.*—Throughout Europe, Central Asia, North and South Africa, North America, Brazil.

### Gen. 23. *Dolerocypris*, Kaufmann, 1900.

*Generic Characters.* Shell very narrow and elongated, with both extremities rather produced. Valves somewhat unequal, the right overlapping the left both in front and behind, edges unarmed; inner duplicatures very broad. Antennæ well adapted for swimming. Maxillæ with both the masticatory lobes and the palp narrowly produced. The other limbs on the whole of normale structure. Caudal rami rather powerfully developed, with the apical claws very unequal in length, both coarsely denticulated, dorsal seta very small and attached near the end.

*Remarks.*—This genus was proposed in the year 1900 by Kaufmann, to include *Cypris fasciata* O. Fr. Müller, and has been admitted by the more recent authors. In addition to the European species described below, 4 other nearly allied species have in recent times been recorded from more southern latitudes.



49. *Dolerocypris fasciata* (O. Fr. Müller).

(Pl. LVIII).

*Cypris fasciata*, O. Fr. Müller, Entomostraca, p. 53, Pl. IV, figs. 1—3.Syn: *Monoculus fasciatus*, Jurine.„ *Cypris ehippiata*, Koch.„ *Herpetocypris fasciata*, Brady & Norman.„ *Stenocypris fasciata*. G. O. Sars.„ *Eucypris fasciata*, Daday.

*Specific Characters.*—*Female.* Shell, seen laterally, narrow oblong in shape, greatest height in the middle and only slightly exceeding  $\frac{1}{3}$  of the length, dorsal margin evenly arched in the middle and sloping slowly to each extremity, ventral margin almost straight, anterior extremity narrowly rounded off at the end, posterior rather narrower and drawn out to an obtuse corner; —seen dorsally, narrow fusiform in outline, with the greatest width not fully attaining  $\frac{1}{3}$  of the length, both extremities gradually narrowed and nearly equal. Surface of shell smooth and finely hairy; right valve with a well defined marginal area in front, wanting on the left valve. Caudal rami straight, sublinear in form, with the dorsal edge very finely ciliated in its outer part, distal claw fully half the length of the ramus and almost twice as long as the proximal one, both armed behind with a double row of coarse denticles; dorsal seta so very small as easily to escape attention; apical bristle well developed.

Colour light olivaceous, with a very conspicuous dark, saddle-like band across the back behind the ocular region, extending down to about the centre of the shell. Ripe ova and ovarian tubes shining through the shell with a bright orange hue.

Length of adult female 1.60 mm.

*Male* unknown.

*Remarks.*—The present form is readily recognised from any of our other fresh water Ostracoda by the extremely narrow and elongate shape of the shell and, when examined in the fresh state, also by its characteristic colour. It was formerly erroneously referred by me to the genus *Stenocypris*, from which it in reality differs essentially in several respects. Nor can it, as done by Brady and Norman, be referred to the genus *Herpetocypris*, as it is by no means devoid of swimming power.

*Occurrence.*—I have only met with this form in 2 localities of our country, viz., in a small grassy pool at Lysaker and in a similar pool at the border of Østensjø lake, both localities in the neighbourhood of Christiania. The

movements of the animal are not particularly rapid, though it is often seen to swim freely about in the water in the usual manner.

*Distribution*.—Throughout Europe, Siberia, Sumatra (G. O. Sars).

## Gen. 24. *Herpetocypris*, Brady & Norman, 1889.

*Generic Characters*.—Shell elongate, more or less reniforme in shape, with the dorsal face scarcely at all arched. Valves conspicuously unequal, the left being the larger and considerably overlapping the right both in front and behind, edges smooth. Antennæ not adapted for swimming, the natatory setæ of the posterior ones being quite rudimentary. Maxillæ with the masticatory lobes rather produced, spines on the outermost lobe distinctly denticulated, palp with the distal joint slightly widening at the end. Maxillipeds with the vibratory plate small, but well defined, palp slender and attenuated. Both pairs of legs rather elongated. Caudal rami comparatively strong, sublinear in form, with the dorsal edge minutely spinulose, apical claws rather unequal in size and distinctly denticulated, dorsal seta very small and attached close to the apex.

*Remarks*.—This genus was proposed in the year 1889 by Brady and Norman, to include *Cypris reptans* Baird and some other species considered by them to be congeneric with it, and was chiefly characterised by the rudimentary condition of the natatory setæ on the posterior antennæ, causing the animal to be quite devoid of swimming power; hence the generic name proposed. The genus is here taken in a much more restricted sense than done by Brady and Norman, only the type [species being left in this genus, whereas the other species referred to it by the said authors have been discarded and transferred to the next genus. Dr. Kaufmann has also confined the limits of this genus in a similar manner, though one of his species, *H. peregrina* must be removed from the genus. Only the type species is represented in the Fauna of Norway.

### 50. *Herpetocypris reptans* (Baird).

(Pl. LXIX).

*Candona reptans*, Baird, British Entomostraca, p. 160, Pl. XIX, figs. 3, 3 a.

Syn: *Cypris reptans*, Lilljeborg.

„ — *virescens*, Brady.

*Specific Characters*.—*Female*. Shell, seen laterally, oblong reniform in shape, height almost equal throughout and not attaining half the length, dorsal margin nearly straight and horizontal, with a slight angular bend in the ocular

region, ventral margin gently sinuated, anterior extremity somewhat deflexed and obliquely rounded, posterior blunted, with the lower corner rounded off; —seen dorsally, narrow oblong, with the greatest width behind the middle and about equal to  $\frac{2}{5}$  of the length, anterior extremity gradually narrowed to an acute point, posterior extremity more obtuse. Valves conspicuously unequal, the left one considerably overlapping the right in front as also along the ventral face, exhibiting moreover a well defined marginal zone closely striated transversally; inner duplicatures rather broad in front and of somewhat different shape in the 2 valves; surface of shell smooth and clothed anteriorly with delicate densely crowded hairs, posteriorly with scattered rather long bristles. Natatory setæ of posterior antennæ much reduced, scarcely extending to the middle of the succeeding joint. Caudal rami rather slender and slightly curved, with the base somewhat thickened, dorsal edge fringed with 4—5 successive rows of very minute spinules, distal claw not attaining half the length of the ramus, but nearly twice as long as the proximal one, both distinctly denticulated, dorsal bristle very small, apical one very much longer.

Colour more or less olivaceous green, clouded with darker shadows.

Length of adult female amounting to 2.60 mm.

*Male* unknown.

*Remarks.*—This form was described as early as the year 1850 by Baird, but was erroneously referred by that author to the genus *Candona*. It is one of our largest fresh water Ostracoda, and easily recognisable from any of them by its elongate reniform shell, resembling however in this respect closely some of the foreign species, for instance the African species, *H. Chevreuxi* G. O. Sars, yet exhibiting some well marked differences, in particular as to the relative developpement of the natatory setæ on the posterior antennæ.

*Occurrence.*—I have met with this Ostracod occasionally both in the neighbourhood of Christiania and near Trondhjem. It is generally found in tarns and ditches with muddy bottom, and always close to the ground, along which it is seen crawling rather slowly, at times burrying more or less deeply within the loose mud. I have never seen it to make even the slightest attempt to move freely in the water.

*Distribution.*—Throughout Europe.



Gen. 25. **Prionocypris**, Brady & Norman, 1896.

*Generic Characters*.—Shell of somewhat varying shape in the different species but as a rule higher in front than behind. Valves subequal, with the edges in some cases serrate, though more generally smooth; inner duplicatures of moderate size, broader in front than behind. Antennæ not adapted for swimming, the natatory setæ of the posterior ones being quite rudimentary. Maxillæ with the masticatory lobes not much produced, palp narrow, with the distal joint comparatively small and scarcely widening at the end. Legs rather slender. Caudal rami of moderate size, with the apical claws less unequal than in *Herpetocypris*, dorsal bristle somewhat remote from the apex, apicale one very minute.

*Remarks*.—This genus was proposed in the year 1896 by Brady and Norman, and only founded on a single species, *P. serrata*, the generic name alluding to the serrated edges of the valves in that species. The genus was subsequently admitted by Kaufmann, who refers to it also the form recorded by Brady under the name *Cypris tumefacta*. In the present account 3 other species are provisionally included in the same genus.

51. **Prionocypris lutaria** (Koch).

(Pl. LX).

*Cypris lutaria*, Koch, Deutschlands Crustaceen etc.Syn: *Cypris Jurini*, Zaddack." — *lucida*, Lilljeborg." *Herpetocypris strigata*, Brady & Norman." — *Jurini*, G. O. Sars." — *peregrina*, Kaufmann." *Eucypris lutaria*, Alm.

*Specific Characters*.—*Female*. Shell, seen laterally, oblong oval in shape, greatest height somewhat in front of the middle and about equalling half the length, dorsal margin gently arched, with a slight indication to an angle behind the ocular region, and rather steeply sloping behind, ventral margin very slightly sinuated, anterior extremity broadly rounded off, posterior much narrower and obliquely blunted;—seen dorsally, elliptical in outline, with the greatest width in the middle and about equalling  $\frac{2}{3}$  of the length, both extremities pointed and nearly equal. Surface of shell smooth and polished, clothed with short and delicate hairs; inner duplicatures of valves not very broad. Natatory setæ of posterior antennæ scarcely extending beyond the middle of the succeeding joint. Spines on the outermost masticatory lobe of



maxillæ coarsely denticulated. Apical claw of anterior legs very slender and elongated. Caudal rami almost straight and slightly attenuated, with the dorsal edge very finely spinulose, apical claws rather slender and not much unequal, the distal one about half the length of the ramus, dorsal bristle more than twice as long as the apical one.

Colour pale yellow with an olivaceous tinge and clouded with irregular bluish green shadows.

Length of adult female amounting to 2.50 mm.

*Male* unknown.

*Remarks.*—This form has by some authors been identified with *Cypris strigata* of O. Fr. Müller; but this identification is certainly wrong, and is also decidedly rejected by the most recent author, Dr. Alm. On the other hand no doubt can arise on the identity of *Cypris lutaria* of Koch with the present species, and as the specific name proposed by that author is of earlier date than either *Jurini* or *lucida*, it ought of course to be retained for the present form. As to its systematic position, it has generally by recent authors been placed in the genus *Eucypris* Vávra. But this cannot by any means be admitted, as it differs very essentially from the species of that genus in the rudimentary condition of the natatory setæ on the posterior antennæ and the consequent absolute want of swimming power. Nor can it, as done by Brady and Norman, be referred to the genus *Herpetocypris*, as the structure of the shell is very different. On the other hand I do not find any objection for including it in the genus *Prionocypris*, as here defined. It is one of our largest fresh water Ostracoda, and moreover easily recognizable by the general form of the shell and its colour.

*Occurrence.*—I have taken this handsome Ostracod, early in the summer, rather abundantly in some ditches with grassy bottom near Christiania (Ulevold). The animals were found constantly keeping at the bottom, they being quite unable to move freely in the water.

*Distribution.*—Throughout Europe, Central Asia.

## 52. *Prionocypris glacialis*, G. O. Sars.

(Pl. LXI, fig. 1).

*Herpetocypris glacialis*, G. O. Sars, Oversigt af Norges Crustaceer II, p. 61.

Syn: *Cypris Jurini*, G. O. Sars (non Zaddach).

„ *Eucypris glacialis*, Alm.

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally, oblong oval in shape, greatest height in front of the middle and exceeding somewhat

half the length, dorsal margin rather evenly arched and sloping gently behind, ventral margin almost straight, anterior extremity broadly rounded off, posterior somewhat narrower and obtuse at the end;—seen dorsally, broadly fusiform in outline, with the greatest width in the middle and about equal to half the length, both extremities pointed and nearly equal. Surface of shell densely clothed with rather coarse hairs. Natatory setæ on the posterior antennæ scarcely extending beyond the middle of the succeeding joint. Spines on outermost masticatory lobe of the maxillæ armed near the extremity on each side with 2 opposite strong denticles. Caudal rami resembling in structure those of the preceding species.

Colour dark fuscous, with a bluish green shadow dorsally behind the ocular region.

Length of adult female 1.60 mm.

*Male* unknown.

*Remarks.*—This form was at first (1866) confounded by me with the preceding species, to which it certainly bears some resemblance in its general appearance. It was however subsequently subjected to a closer examination, and its specific distinctness thereby ascertained. It is of much smaller size and moreover distinguished by its more tumid and densely hairy shell, as also by its somewhat different colour.

*Occurrence.*—This is a true arctic species, being almost exclusively confined within the polar circle. The specimens at first observed were taken during the Norwegian North Atlantic Expedition in small water-holes at Advent Bay, Spitsbergen. Subsequently I was enabled to include this form also in the Norwegian Fauna, having taken some specimens at Smelroren, on the mainland inside Vardø, East Finmark. According to Dr. Alm, this form has also been met with, as a glacial relict, on the high-plateau of Filefjeld (Jotunheimen).

*Distribution.*—Greenland, Spitsbergen, Bear Island, Nowaja Zembla, Swedish Lapmark.

### 53. *Prionocypris pigra* (Fischer).

(Pl. LXI, fig. 2).

*Cypris pigra*, Fischer, Mem. Soc. Imp. de St. Petersburg, Vol. 7, p. 158, Pl. 9, figs. 11—16.

Syn: *Cypris tumefacta*. Brady.

„ *Herpetocypris tumefacta*, Brady & Norman.

„ *Eucypris pigra*, Alm.

*Specific Characters.*—*Female*. Shell very tumid, seen laterally, oval trigonal in shape, greatest height nearly in the middle and considerably ex-

ceeding half the length, dorsal margin gibbously arched in the middle and sloping rather steeply both in front and behind, ventral margin very slightly sinuated, anterior extremity obliquely rounded, posterior somewhat broader and likewise obliquely rounded off;—seen dorsally, very broadly ovate in outline, with the greatest width in the middle and somewhat exceeding the height. both extremities pointed, the anterior more so than the posterior. Surface of shell smooth and clothed with fine hairs. Natatory setæ on posterior antennæ very much reduced, not nearly extending to the middle of the succeeding joint. Spines on outermost masticatory lobe of the maxillæ quite smooth. Caudal rami rather narrow and nearly straight, with the dorsal edge smooth, distal claw about half the length of the ramus, dorsal bristle slightly longer than the apical one.

Colour pale whitish yellow, slightly clouded dorsally behind the ocular region.

Length of adult female about 1 mm.

*Male* unknown.

*Remarks.*—The identity of the above-described form with *Cypris pigra* of Fischer seems to be quite ascertained, and the specific name *tumefacta*, under which this form has generally been recorded, must of course cede the older name proposed by Fischer. It is a very distinct and easily recognisable species, differing considerably in its general appearance from the other forms included in the present genus, though its place within it may be regarded as unquestionable.

*Occurrence.*—I have taken this form very abundantly in a shallows ditch near Christiania, and have also met with it in our largest lake, Mjøsen at Hamar, where it occurred not rarely on a woody bottom at a depth of 2—4 fathoms. The animals are found slowly crawling on the bottom, being quite unable to move freely in the water.

*Distribution.*—Sweden, British Isles, Germany, Switzerland, Russia.

#### 54. *Prionocypris olivacea* (Brady & Norman).

(Pl. LXII).

*Herpetocypris olivacea*, Brady & Norman, Monograph of Mar. and Fresh water Ostracoda 1889, p. 89, Pl. 1, figs. 3, 4.

Syn: *Ilyodromus olivaceus*, Brady & Norman 1896.

*Specific Characters.*—*Female.* Shell, seen laterally, oval reniform in shape, greatest height a little in front of the middle and about equalling half the length, dorsal margin gently arched, ventral slightly sinuated, anterior extremity



somewhat obliquely rounded, posterior scarcely narrower and obtuse at the lower corner;—seen dorsally, oblong oval in outline, slightly constricted in front of the middle, greatest width behind and not attaining half the length, both extremities obtusely pointed, the anterior narrower than the posterior. Surface of shell of a somewhat dull appearance, and clothed with short hairs. Natatory setæ of posterior antennæ extremely rudimentary and easily overlooked, apical claws rather strong and coarsely denticulated. Spines on outermost masticatory lobe of the maxillæ armed with 2 strong denticles on each side of the terminal part. Caudal rami comparatively strong and quite straight, with the dorsal edge minutely spinulose, apical claws remarkably stout, the distal one not nearly attaining half the length of the ramus, dorsal bristle replaced by a thickish spine somewhat similar to the apical claws, but much shorter.

Colour uniformly dark olivaceous green.

Length of adult female 1.25 mm.

*Male* unknown.

*Remarks.*—The reference of this form to the Australian genus *Ilyodromus* G. O. Sars, proposed by Brady and Norman, and also sanctioned by Kaufmann, seems to me to be quite inadmissible, and is in reality only founded on the somewhat similar transformation of the dorsal bristle on the caudal rami. In other respects this genus differs very conspicuously both as to the structure of the shell and to that of some of the appendages. On the other hand, apart from the above-named particularity, I find that the agreement of the present species with the preceding ones is quite unmistakable.

*Occurrence.*—I have hitherto only met with this form in a single place, viz., in a shallow ditch near Christiania. The animal is rather sluggish, and keep constantly at the bottom.

*Distribution.*—British Isles, Hungary, Bohemia, Switzerland.

## Group 7. Cypridopsides.

*Remarks.*—The forms referable to this group are in particular distinguished from the other fresh water Cypridæ by the rudimentary condition of the caudal rami. True, in 2 of the genera, *Cypretta* Vavra and *Paracyprretta* G. O. Sars, the reduction of these rami appears somewhat less complete than in the other genera; but also in this case the reduction is great enough to distinguish them from the more typical Cypridæ. Several genera have been established



within this group; but their right definition is by no means in every case quite clear. In the Fauna of Norway 3 of these genera are represented.

Gen. 26. **Pionocypris**, Brady & Norman, 1896.

Syn: *Cypridopsis*, auctorum (part).

*Generic Characters*.—Shell tumid and more generally short and high, with the ventral face more or less flattened. Valves only slightly unequal, the left one being a little larger than the right, with the shelf-like expansion of the ventral edge strongly marked; inner duplicatures moderately broad in front and continued along the ventrale side to the hind extremity. Antennæ powerfully developed and well adapted for swimming. Maxillæ with both the palps and the masticatory lobes narrowly produced. Maxillipeds with the vibratory plate more or less reduced. Anterior legs strongly built, with the apical claw very long and slender. Caudal rami quite rudimentary, and apparently immobile, forming 2 small juxtaposed lappets, each terminating in a slender setiform flagellum.

*Remarks*.—This genus was proposed in the year 1896 by Brady and Norman, to comprise some of the species previously referred to the genus *Cypridopsis*, the type of the genus being *Cypris vidua* of O. Fr. Müller. The above-named authors included in this genus also the Australian species, *Cypridopsis globulus* G. O. Sars. But this form has turned out to be referable to an other genus, viz., *Cypretta* Vavra, differing essentially in the structure of the caudal rami.—Several species of the present genus have been recorded, both from Europe and from other continents. To the Fauna of Norway belong 6 species, to be described in the succeeding pages.

55. **Pionocypris vidua** (O. Fr. Müller).

(Pl. LXIII).

*Cypris vidua*. O. Fr. Müller, Entomostraca, p. 55, Pl. IV, figs. 7—9.

Syn: *Cypris sella*, Baird.  
 „ *Monoculus vidua*, Jurine.  
 „ *Cypridopsis vidua*. Brady.

*Specific Characters*.—*Female*. Shell very tumid, seen laterally, short ovoid in shape, greatest height in the middle and almost attaining  $\frac{2}{3}$  of the length, dorsal margin boldly arched in the middle, ventral margin very slightly sinuated and somewhat bowed in the oral region, anterior extremity well rounded off, posterior a little narrower and obtuse at the end;—seen dorsally, broadly ovate,

or somewhat rhomboid in outline, the lateral edges being abruptly curved in the middle, greatest width exceeding somewhat the height, both extremities obtusely pointed, the anterior narrower than the posterior. Surface of shell rather densely hairy, and distinctly sculptured with closely set small impressed pits.—Natatory setæ on posterior antennæ densely ciliated and extending beyond the tips of the apical claws. Vibratory plate of maxillipeds provided with 5 setæ. Caudal rami very small, lash-shaped, with a minute bristle on the dorsal edge, terminal flagellum longer than the stem.

Colour yellowish white, with 3 dark, somewhat irregular, band-like patches running down the valves from the dorsal face to about their middle, the foremost patch lying immediately inside the anterior edge, the other 2 connected dorsally on each side by a longitudinal band.

Length of adult female 0.70 mm.

*Male* unknown.

*Remarks.*—This form was described and figured as early as the year 1785 by O. Fr. Müller, and has generally been recorded by recent authors under the name *Cypridopsis vidua*. It is the type of the genus *Pionocypris*, as here defined.

*Occurrence.*—I have taken this little Ostracod in many places of our country in ponds and ditches with clear water and grassy bottom. Though in most cases keeping at the ground, the animals are very well adapted for swimming, and are seen at times moving rather quickly through the water.

*Distributions.*—Throughout Europe, Central Asia, North America.

## 56. *Pionocypris helvetica* (Kaufmann).

(Pl. LXIV, fig. 1).

*Cypridopsis helvetica*, Kaufmann, Cypriden und Darwinoliden der Schweiz, p. 363, Pl. 19, figs. 4, 5; Pl. 22, figs. 10, 11.

*Specific Characters.*—*Female.* Shell, seen laterally, of a shape rather similar to that of the preceding species, though comparatively somewhat less high in proportion to the length;—seen dorsally, however, far less broad, and regularly ovoid in outline, with the lateral edges quite evenly curved, and the greatest width scarcely exceeding the height, anterior extremity narrower than the posterior, which is rounded off at the end. Surface of shell quite smooth and finely hairy, without any trace of the impressed pits characterising the shell of the preceding species. Natatory setæ on the posterior antennæ still more prolonged. Vibratory plate of maxillipeds with only 3 setæ. Caudal rami with the terminal flagellum very long and slender.

# Ostracoda

Cypridæ

Podocopa

Pl. XLIX



G. O. Sars del.

*Ilyocypris biplicata*, (Koch)



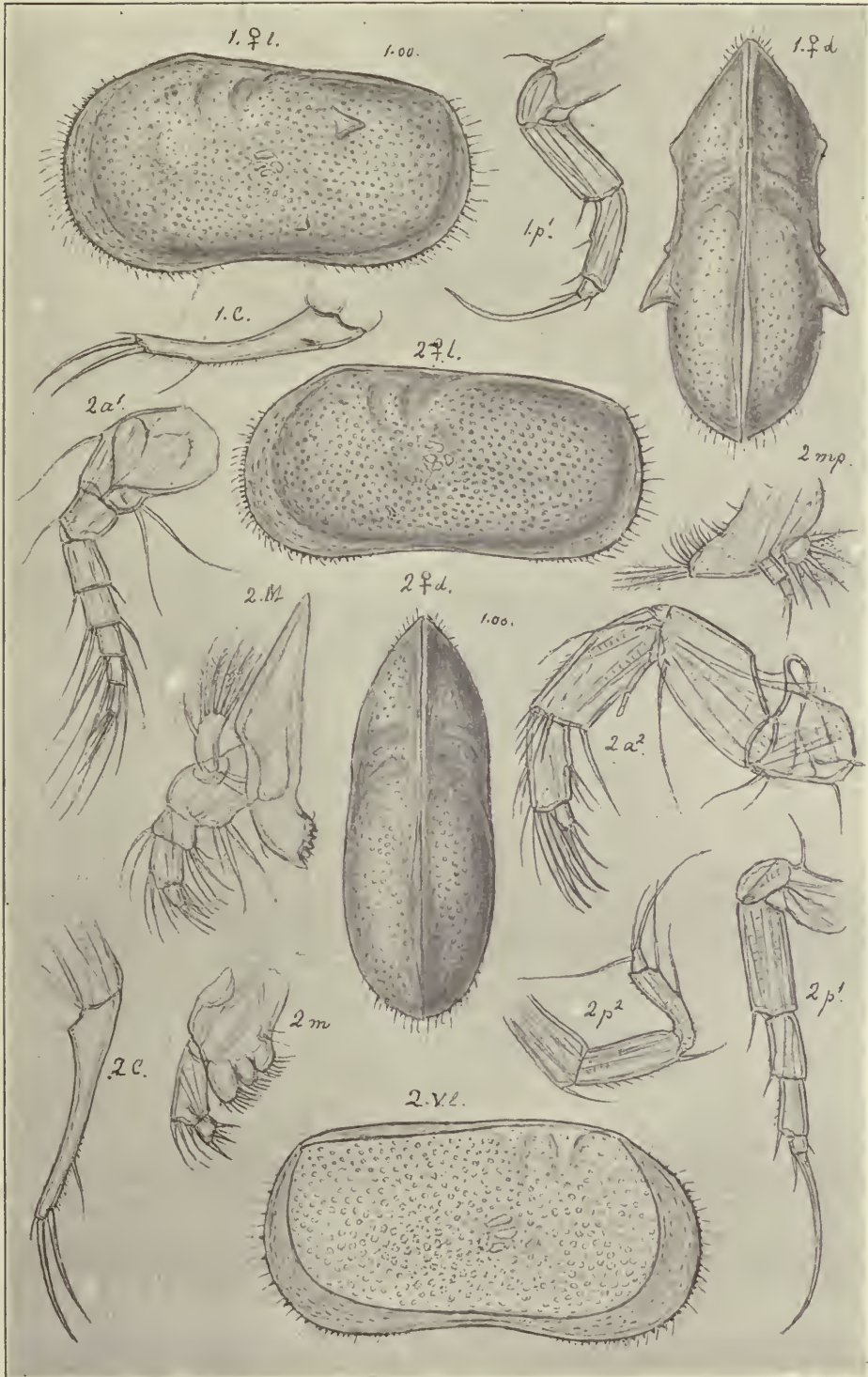


# Ostracoda

Cypridæ

Podocopa

PI L



G. O. Sars del.

1. *Ilyocypris gibba*, (Ramdohr)
2. *Iliocyprilla Bradyi*, G. O. Sars



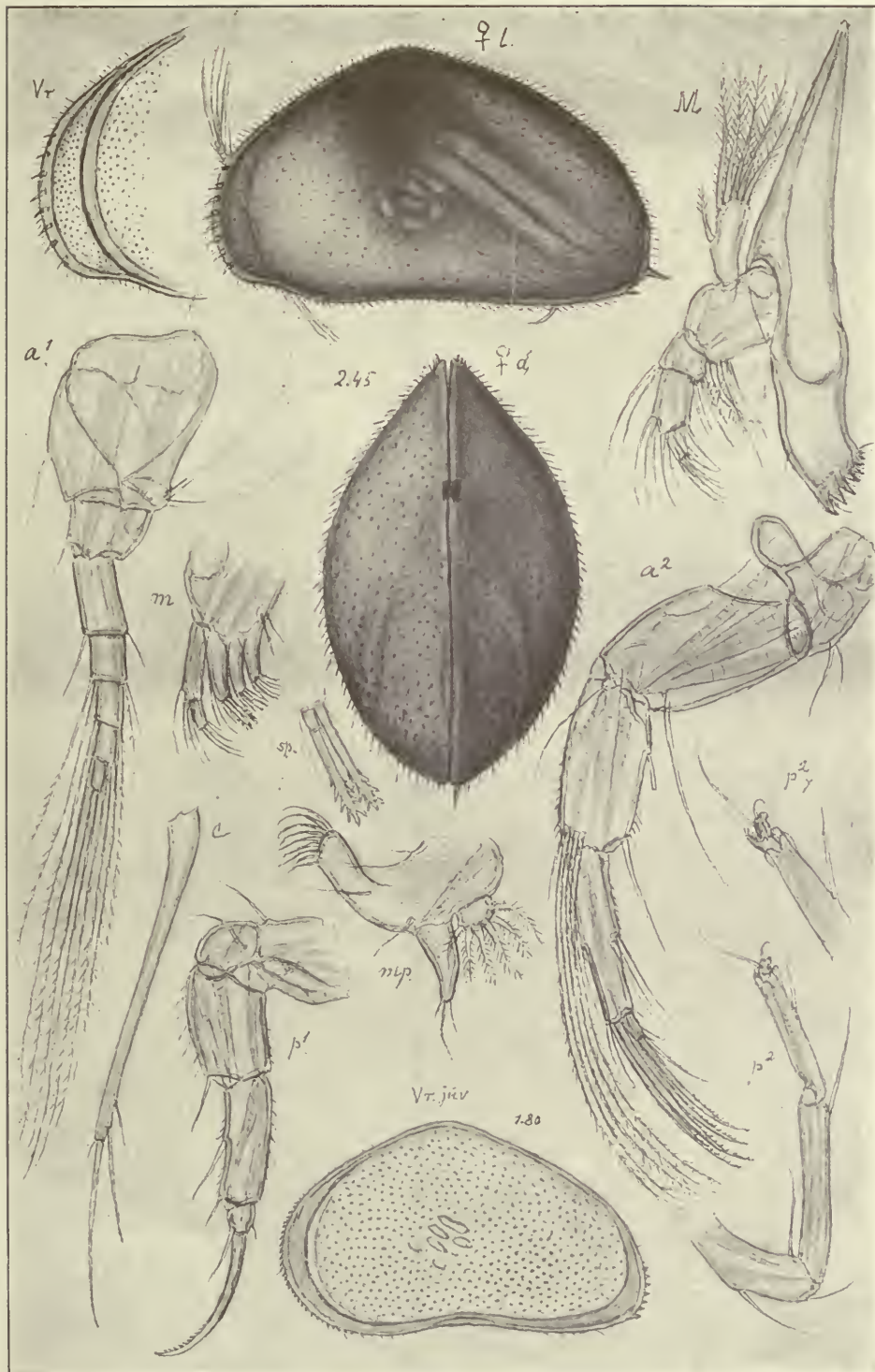


# Ostracoda

Cypridæ

Podocopa

Pl. LI



G. O. Sars del.

*Cypris pubera*, O. Fr. Müller

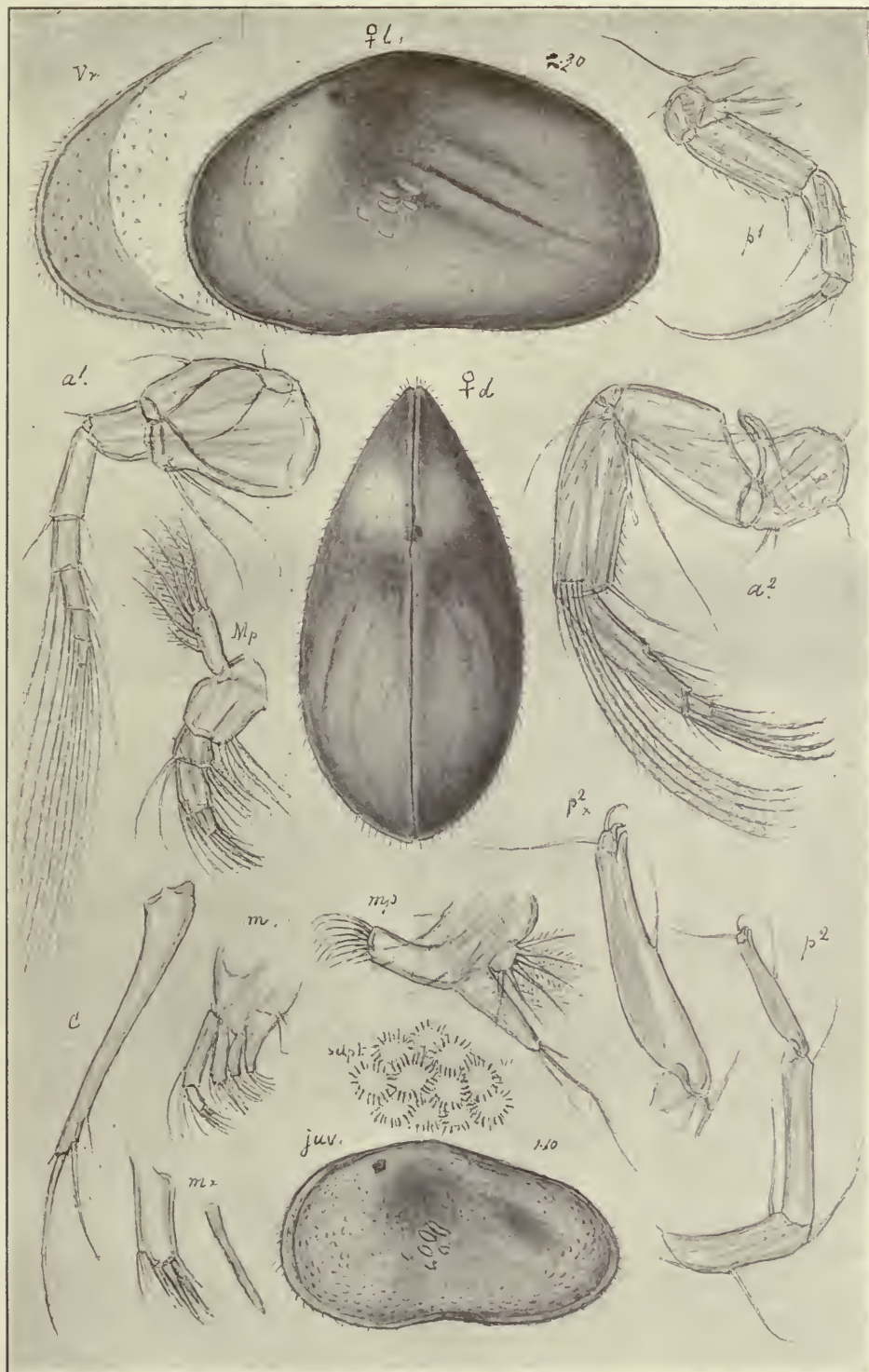


# Ostracoda

Cypridæ

Podocopa

Pl. LII



G. O. Sars del.

*Eucypris virens*, (Jurine)



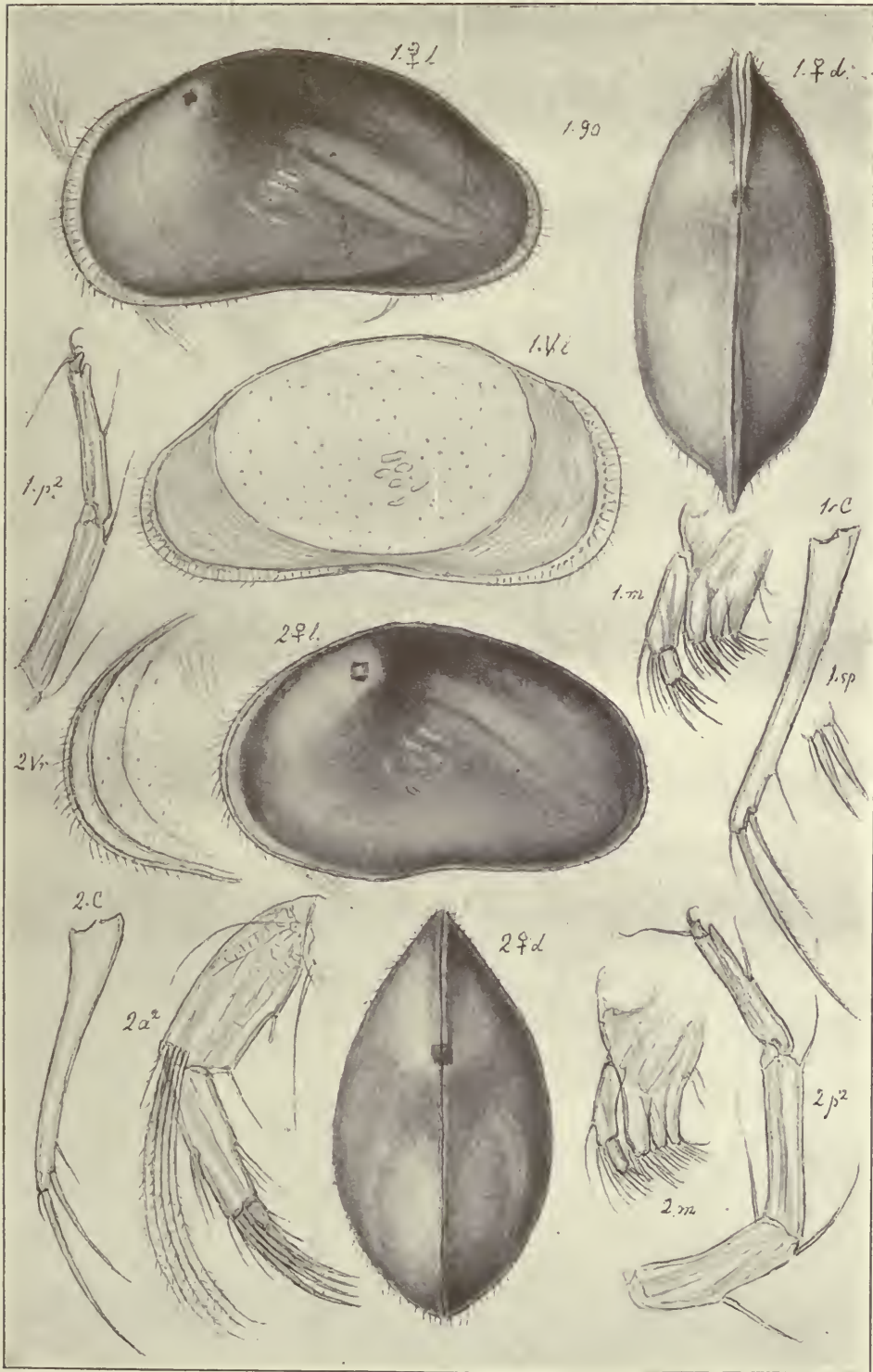


# Ostracoda

Cypridæ

Podocopa

Pl. LIII



G. O. Sars del.

1. *Eucypris crassa* (O. Fr. Müller)
2. " *elliptica*, (Baird)



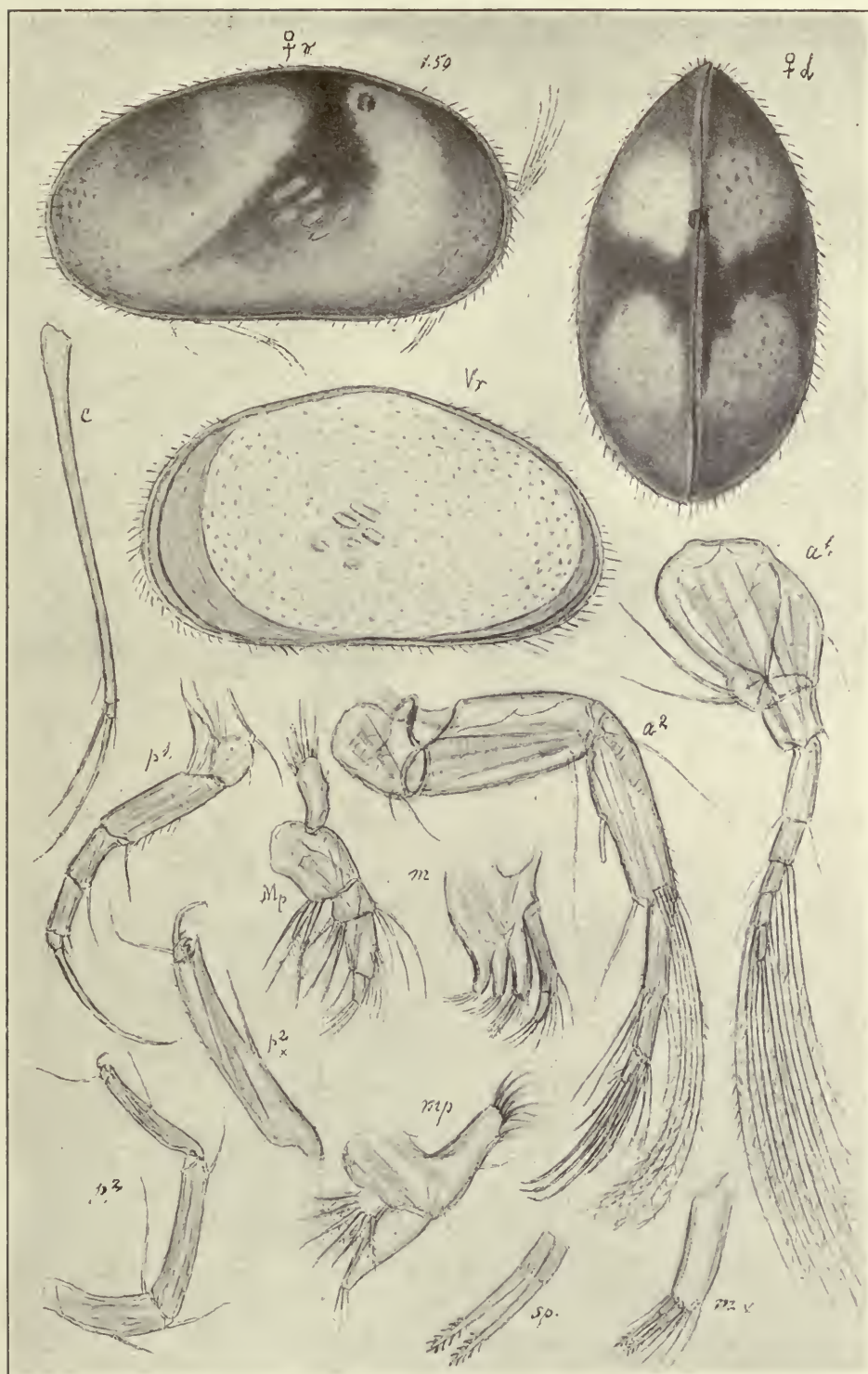


# Ostracoda

Cypridæ

Podocopa

Pl. LIV



G. O. Sars del.

*Cypricercus fuscatus*, (Jurine)

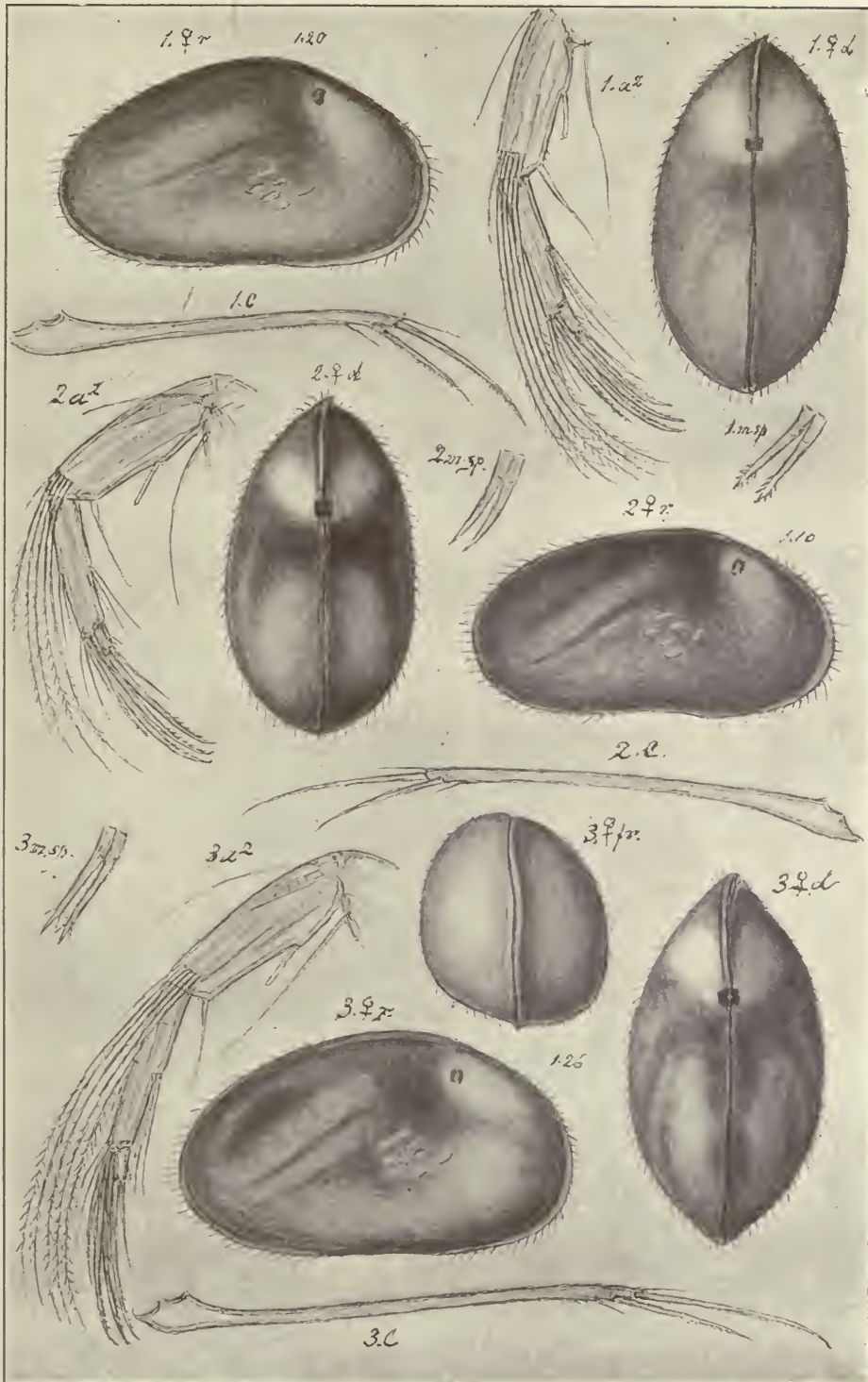


# Ostracoda

Cypridæ

Podocopa

Pl. LV



G. O. Sars del.

1. *Cypricerus affinis*, (Fischer)
2.     "     *hirsutus*, (Fischer)
3.     "     *obliquus*, (Brady)



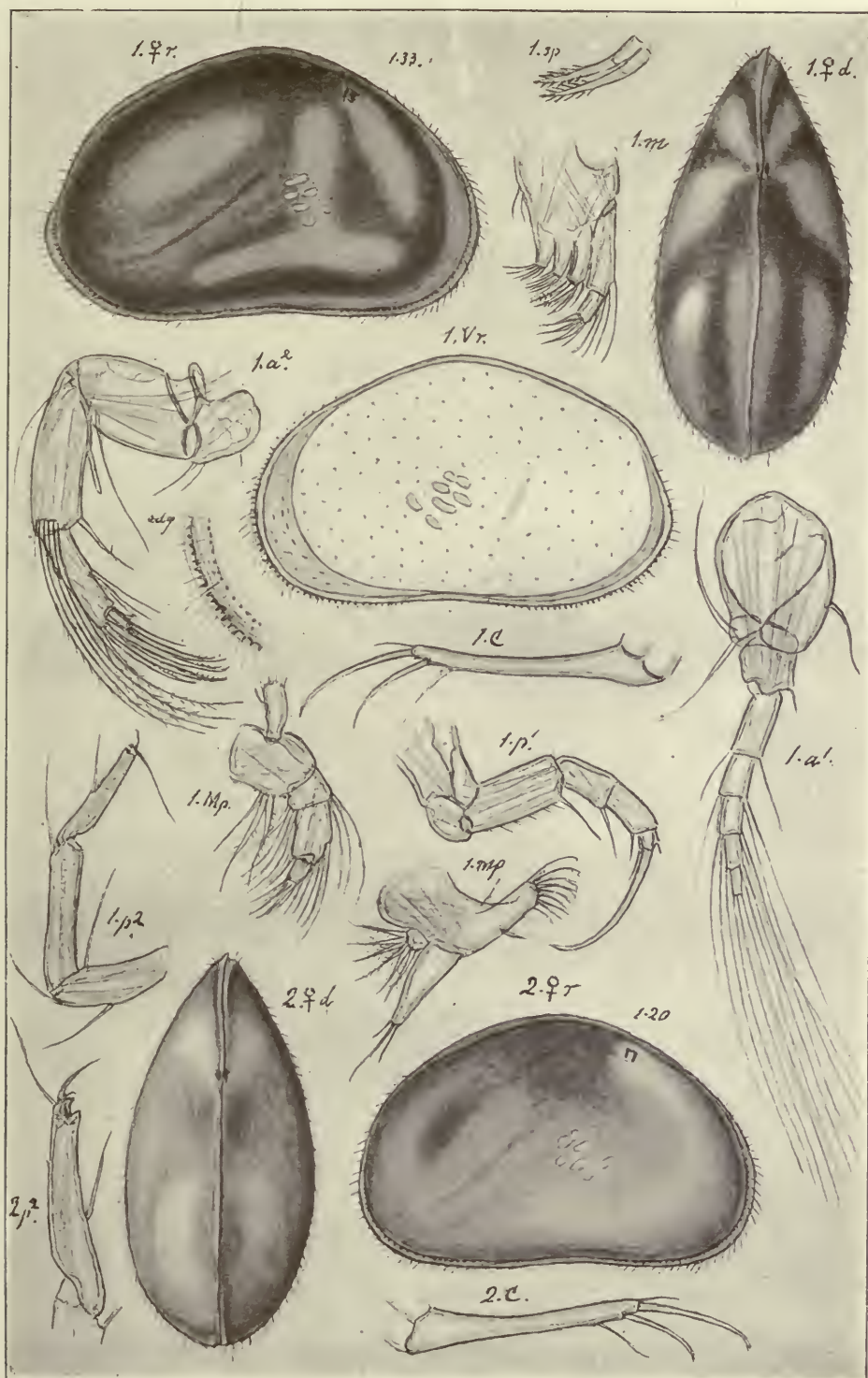


# Ostracoda

Cypridæ

Podocopa

Pl. LVI



G. O. Sars del.

1. *Cyprinotus salinus*, (Brady)
2. " *fretensis*, (Brady)

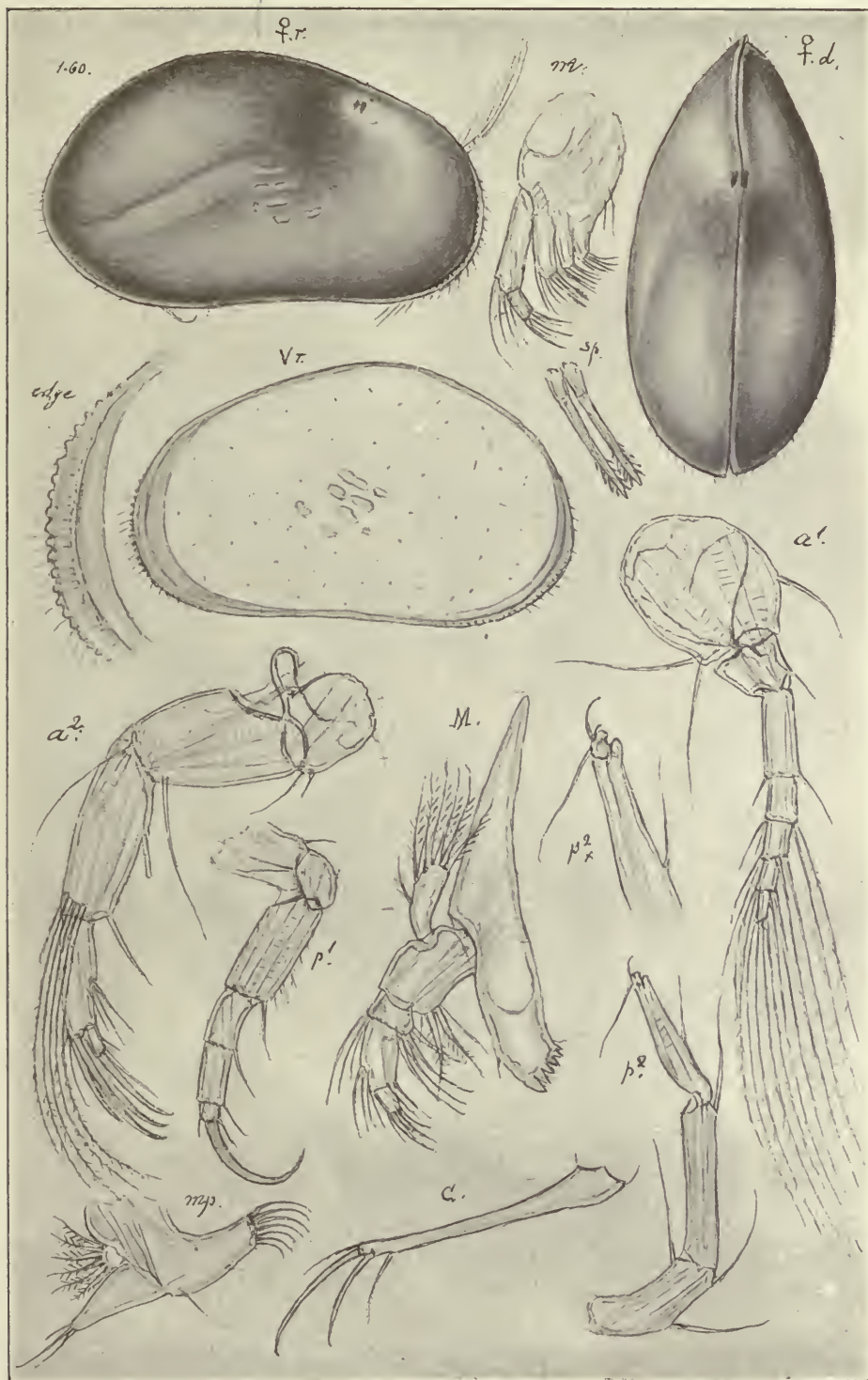


# Ostracoda

Cypridæ

Podocopa

Pl. LVII



G. O. Sars del.

*Heterocypris incongruens*, (Ramdohr)



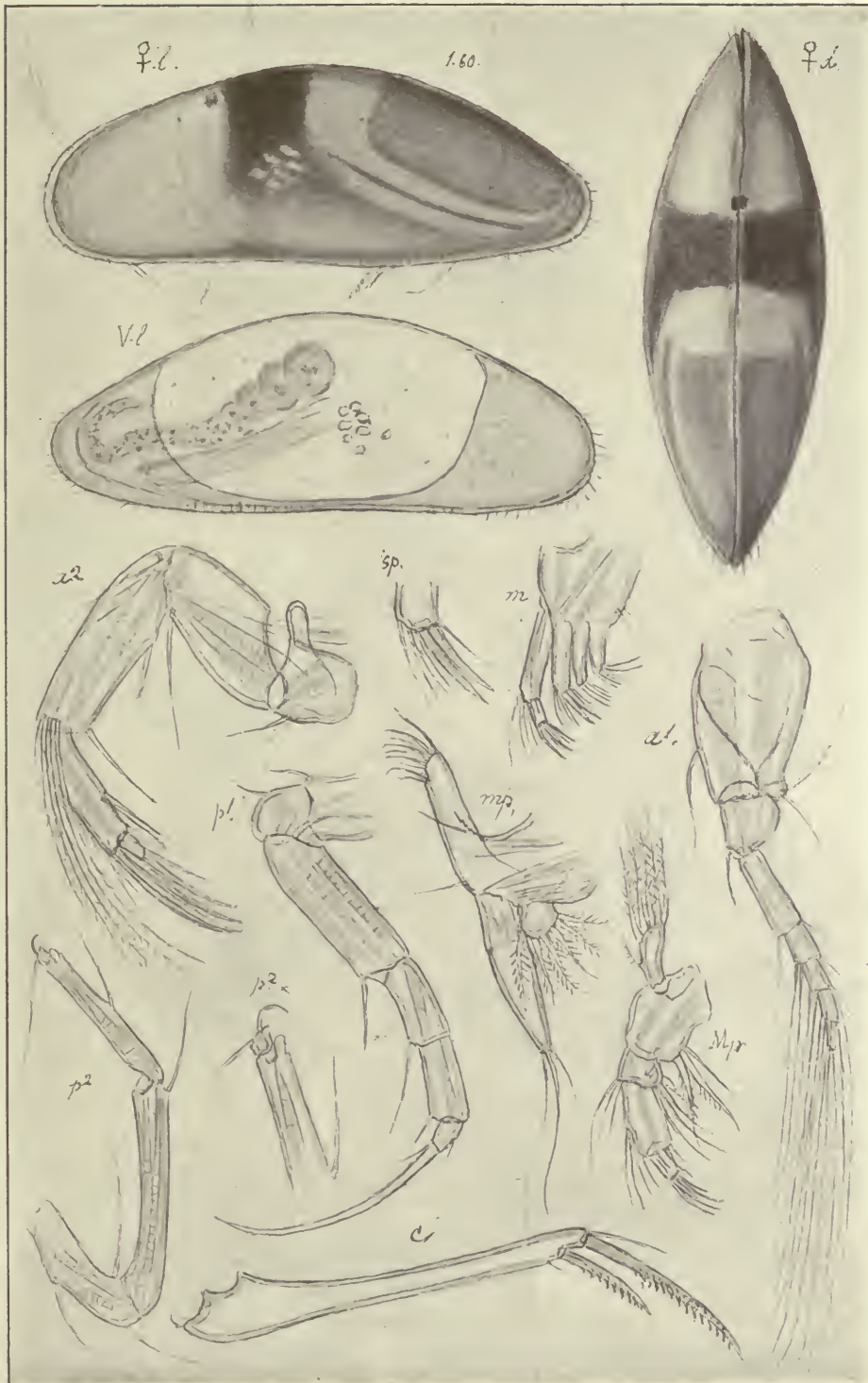


# Ostracoda

Cypridæ

Podocopa

Pl. LVIII



G. O. Sars del.

*Dolerocypris fasciata*, (O. Fr. Müller)



# Ostracoda

Cypridæ

Podocopa

Pl. LIX



G. O. Sars del.

*Herpetocypris reptans*, (Baird)



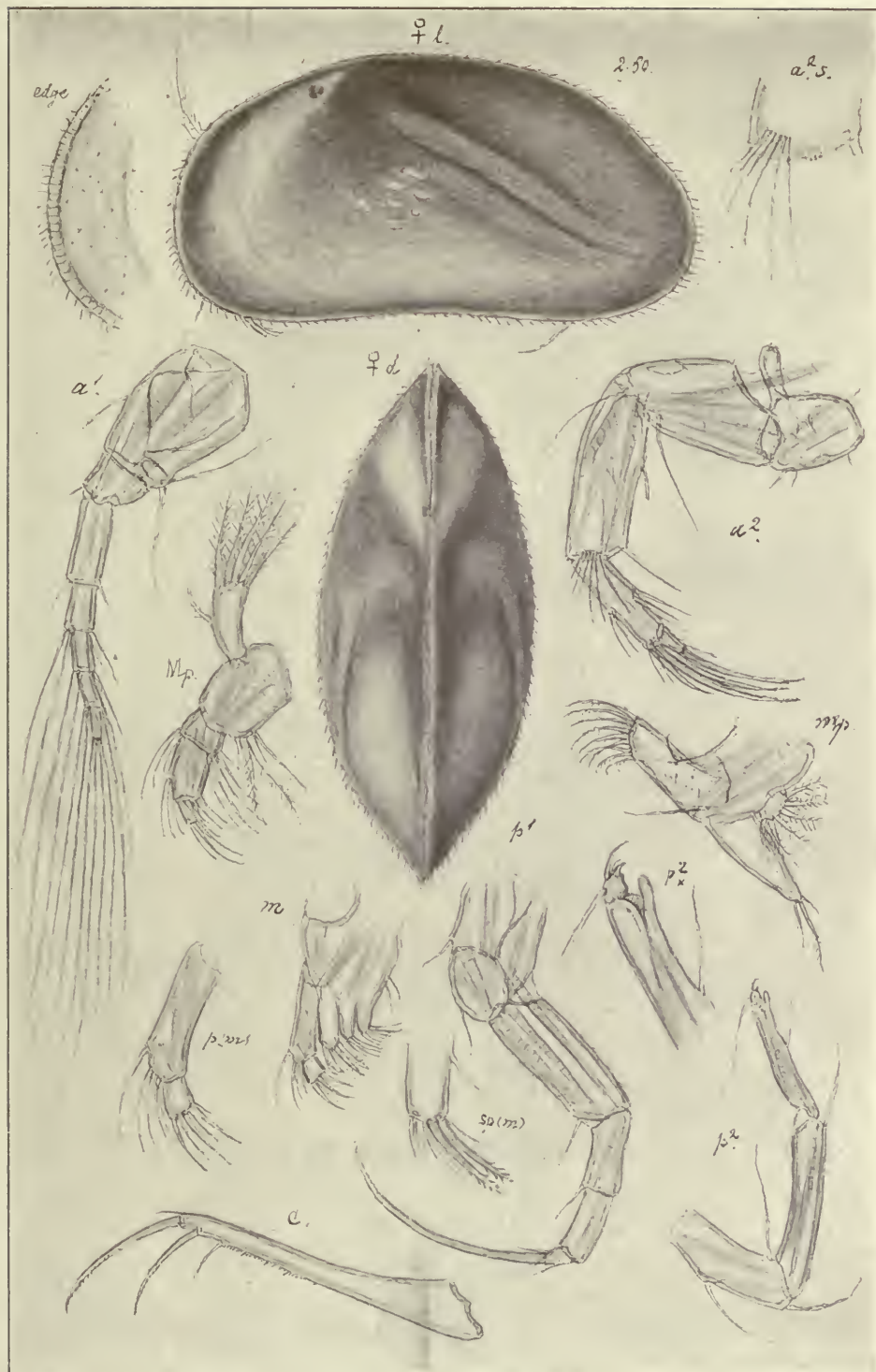


# Ostracoda

Cypridæ

Podocopa

Pl. LX



G. O. Sars del.

*Prionocypris lutaria*, (Koch)

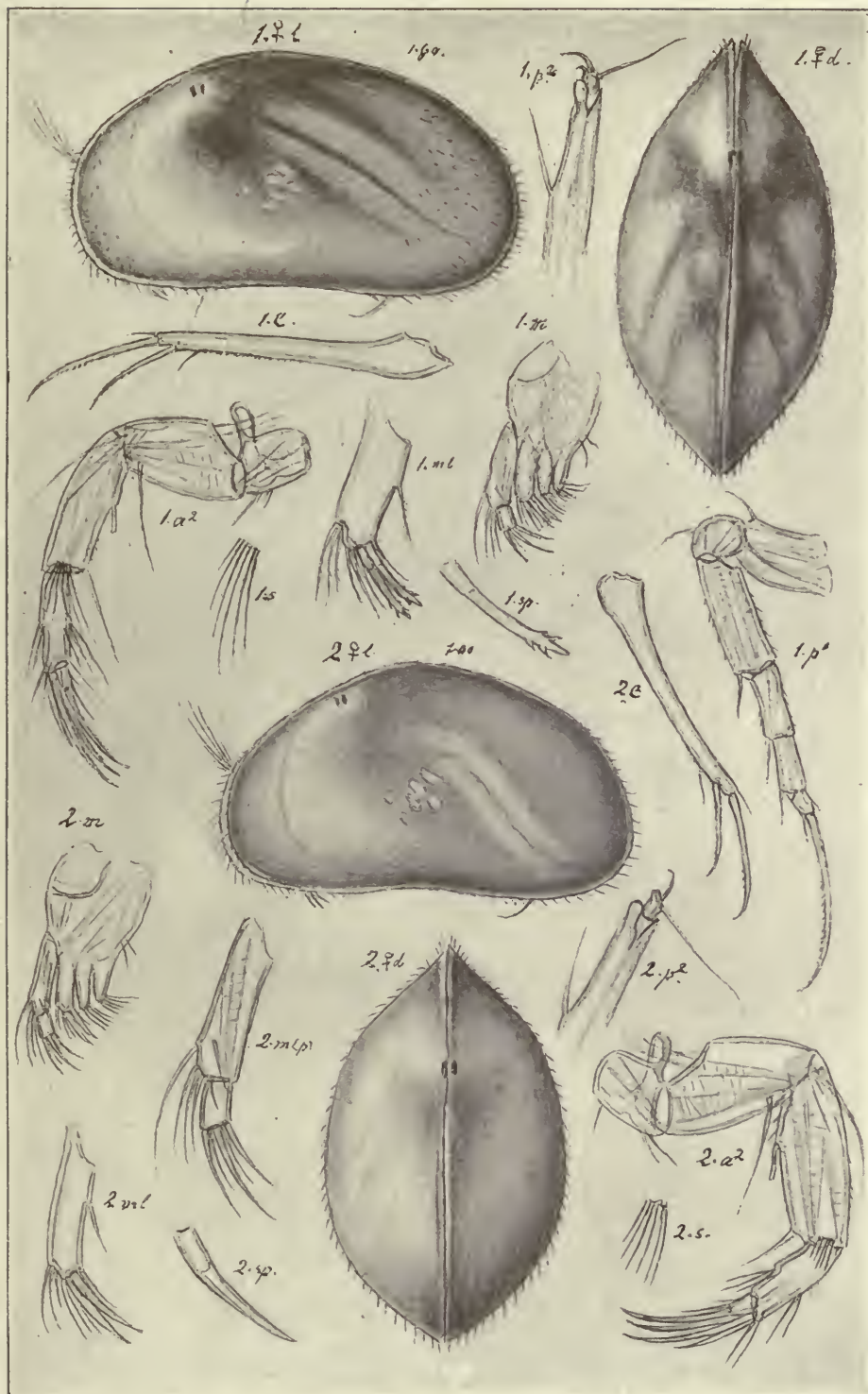


# Ostracoda

Cypridæ

## Podocopa

Pl. LXI



G. O. Sars del.

1. *Prionocypris glacialis*, G. O. Sars
2. „ *pigra*, (Fischer)





# Ostracoda

Cypridæ

Podocopa

Pl. LXII



G. O. Sars del.

*Prionocypris olivacea*, (Br. & Norm.)

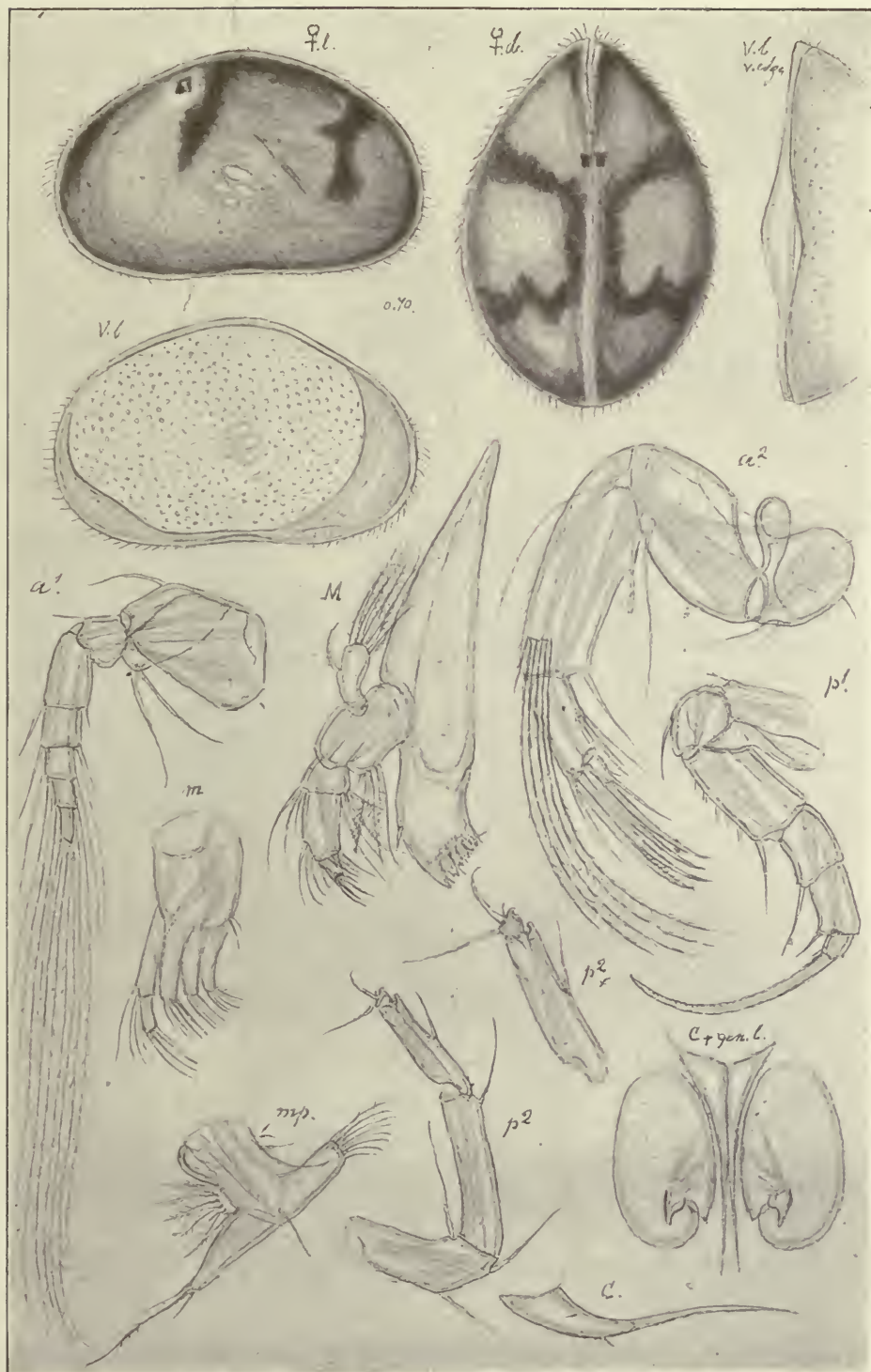


# Ostracoda

Cypridæ

Podocopa

Pl. LXIII



G. O. Sars del.

*Pionocypris vidua*, (O. Fr. Müller)



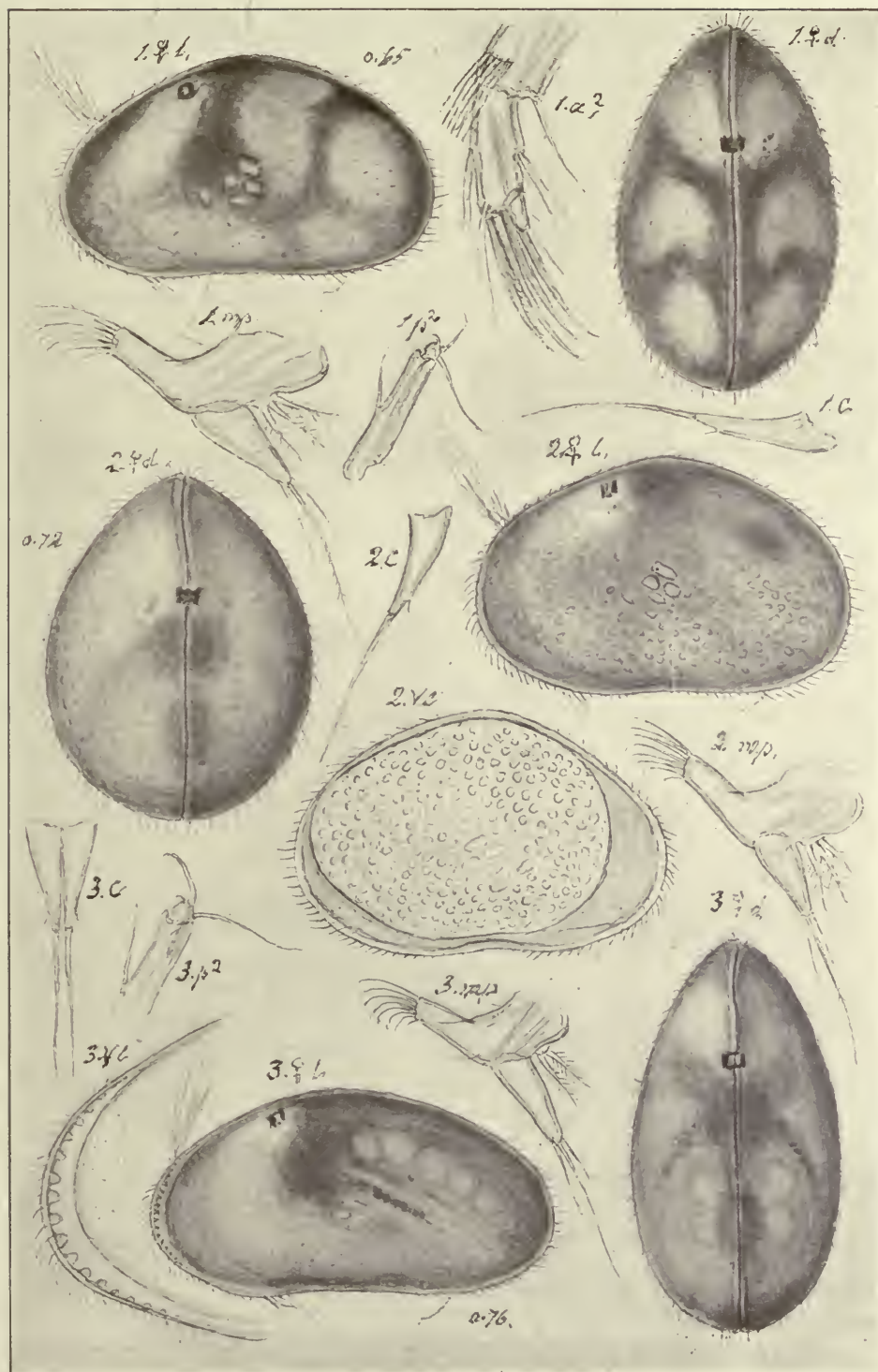


# Ostracoda

Cypridæ

Podocopa

Pl. LXIV



G. O. Sars del.

1. *Pionocypris helvetica*, (Kaufm.)
2.     "     *obesa*, (Brady & Rob.)
3.     "     *elongata*, (Kaufm.)



Colour very similar to that in *P. vidua*, the ground-colour of the shell being pale whitish, and the band-like patches very dark, almost black. In addition to the 3 patches found in the said species, a 4th patch is to be traced close to the hind extremity of the valves.

Length of adult female 0.65 mm.

*Male* unknown.

*Remarks.*—This form has generally been confounded with the preceding species, to which it certainly bears a close resemblance. Dr. Kaufmann has however pointed out some well-marked differences, which prove it to be in reality specifically distinct. I have raised both these forms together from a parcel of dried mud kindly sent to me by Mr. Johansen and taken from a pool near Ottawa, Canada. On examining more closely the specimens abounding in my aquaria, I at once became aware of the marked difference between these 2 forms in the shape and sculpture of the shell, making it very easy to distinguish them, the one from the other, even at a rather low magnifying power.

*Occurrence.*—This species is rather frequently met with, both in small pools and at the borders of greater lakes, and I have taken it as far North as Matsjok in East Finmark. In its behaviour the animal agrees with the preceding species, being however comparatively more active in its movements.

*Distribution.*—Switzerland, and probably in many other places of Europe, North America.

## 57. *Pionocypris obesa* (Brady & Robertson).

(Pl. LXIV, fig. 2).

*Cypridopsis obesa*, Brady & Robertson, Ann. Mag. Nat. Hist. Ser. 4, Vol. III, p. 12, Pl. XVIII, figs. 5–7.

Syn: *Cypridopsella tumida*, Kaufmann.

*Specific Characters.*—*Female.* Shell of a very obese appearance, seen laterally, broadly ovoid in shape, greatest height in the middle and exceeding  $\frac{3}{5}$  of the length, dorsal margin boldly arched, with indication to an angle in the middle, ventral margin slightly sinuated and distinctly bowed in the oral region, anterior extremity broadly rounded off, posterior somewhat narrower and obtuse at the end;—seen dorsally, broadly ovate in outline, with the greatest width behind the middle and considerably exceeding the height, anterior extremity obtusely pointed, posterior evenly rounded off.—Surface of shell finely hairy, and of a somewhat dull appearance, being very distinctly



sculptured with rather coarse rounded pits.—Vibratory plate of maxillipeds with only 2 setæ. Caudal rami about as in *P. vidua*.

Colour of shell uniformly greenish, without any dark patches across the valves.

Length of adult female 0.72 mm.

*Male* unknown.

*Remarks.*—This species was recorded in the year 1869 by Brady and Robertson, but was subsequently withdrawn by the same authors, being only considered to be a variety of *P. vidua*, and this opinion has also been sanctioned by the most recent author, Dr. Alm. Yet, the specific distinctness of this form seems to me to be unquestionable, as it distinguishes itself, not only in the shape and colour of the shell, but also in some of the structural details (maxillipeds). The form recorded by Kaufmann as *Cypridopsella tumida* is apparently identical with the present species. The reference of this form to the genus *Cypridopsella* is quite unreasonable, being only founded on the small number of setæ on the vibratory plate of the maxillipeds. In all other respects it shows itself as a true member of the present genus.

*Occurrence.*—I have only met with this form quite occasionally in some shallow grassy swamps near Christiania.

*Distribution.*—British Isles, Germany, Switzerland, and probably many other parts of Europe.

#### 58. *Pionocypris elongata* (Kaufmann).

(Pl. LXIV, fig. 3).

*Cypridopsella elongata*, Kaufmann, *Cypriden und Darwinuliden der Schweiz*, p. 314, Pl. 19, figs. 14, 15; Pl. 22, figs. 20—23.

*Specific Characters.*—*Female.* Shell unusually elongated, seen laterally, oblong oval in shape, greatest height a little in front of the middle and scarcely exceeding half the length, dorsal margin quite evenly arched, ventral slightly sinuated in the middle and conspicuously bowed in the oral region, anterior extremity somewhat obliquely rounded, posterior narrower and obtuse at the end;—seen dorsally, oblong ovate in outline, with the greatest width behind the middle and slightly exceeding half the length, anterior extremity obtusely pointed, posterior rounded off.—Surface of shell smooth and finely hairy, without any obvious sculpturing. Left valve exhibiting, inside the anterior edge, a row of very conspicuous rounded thickenings.—Vibratory plate of maxillipeds with only 2 setæ. Caudal rami of the usual appearance.

Colour of the shell cinereous green, with a dark shadow dorsally, behind the ocular region.

Length of adult female 0.76 mm.

*Male* unknown.

*Remarks.*—The above-described form is unquestionably identical with *Cypridopsella elongata* of Kaufmann, agreeing pretty well with the figures given by that author. It ought in my opinion to be referred to the genus *Pionocypris*, in spite of the somewhat anomalous shape of the shell. A character very distinctive of the present species, but overlooked by Kaufmann, is the peculiar thickenings occurring inside the anterior edge of the left valve.

*Occurrence.*—I have only met with this form in a single place of our country, viz., in a grassy pond at Asker, West of Christiania; but I have, many years ago, raised the same species rather plentifully from dried mud taken in Algeria and kindly forwarded to me by Mr. Chevreux.

*Distribution.*—Switzerland, Germany, Algeria.

#### 59. *Pionocypris Almi*, G. O. Sars, n. sp.

(Pl. LXV, fig. 1).

*Cypridopsis elongata*, Alm, Monographie der Schwedischen Süßwasser Ostracoden, p. 79 (not Kaufmann).

*Specific Characters.*—*Female.* Shell less elongated than in the preceding species, seen laterally, ovoid in shape; with the greatest height in the middle and considerably exceeding half the length, dorsal margin boldly and rather evenly arched throughout, ventral margin slightly sinuated in the middle and scarcely bowed in the oral region, anterior extremity obliquely rounded, posterior a little broader and obtusely blunted at the lower corner;—seen dorsally, ovate in outline, with the greatest width in the middle and about equalling  $\frac{3}{5}$  of the length, anterior extremity obtusely pointed, posterior rounded off at the end. Surface of shell smooth and finely hairy; left valve without any traces of the marginal areolæ in front, found in the preceding species. Vibratory plate of maxillipeds with 2 setæ. Caudal rami of the usual shape.

Colour of shell uniformly light greenish, without any obvious dark patches.

Length of adult female 0.59 mm.

*Male* unknown.

*Remarks.*—This form has been erroneously identified by Alm with the preceding species, from which it differs decidedly in the far less elongated form of the shell, as also in the absolute absence of the peculiar marginal

areolæ found in that species inside the anterior edge of the left valve. It is also very different from the next species, which Dr. Alm suppose to be the same.

*Occurrence*.—Only a few specimens of this form have as yet come under my notice. They were taken, many years ago, from a grassy pond near Christiania.

*Distribution*.—Sweden (Alm).

## 60. *Pionocypris picta* (Strauss).

(Pl. LXV. fig. 2).

*Cypris picta*, Strauss, Mém. du Mus. d'Hist. Nat., Vol. VII, p. 59, Pl. 1, figs. 17—19.

Syn: *Cypridopsis picta*, G. O. Sars.

*Specific Characters*.—*Female*. Shell rather tumid, seen laterally, short ovoid in shape, greatest height behind the middle and about equalling  $\frac{3}{5}$  of the length, dorsal margin boldly arched behind the middle and sloping rather steeply behind, more slowly in front, ventral margin very slightly sinuated, anterior extremity obliquely rounded, posterior broader and obtuse at the lower corner;—seen dorsally, broadly ovate in outline, with the greatest width behind the middle and about equal to the height, anterior extremity gradually narrowed to an obtuse point, posterior broadly rounded off.—Valves smooth and rather densely hairy. Caudal rami with the stem comparatively short, scarcely half the length of the flagellum.

Colour of shell light bluish green, with a rather conspicuous dark patch on each side arching over the muscular spots, and continued down the valves both in front and behind, extremities of valves tinged with a similar dark hue.

Length of adult female 0.43 mm.

*Male* unknown.

*Remarks*.—This small Ostracod was recorded as early as the year 1821 by Strauss, and has subsequently also been noted by some other authors on the continent, though not observed either in Sweden or on the British Isles. Besides by its small size, it is easily recognised from the other species of the present genus by the shape of the shell and its peculiar colour.

*Occurrence*.—I have taken this form occasionally in grassy ponds and swamps near Christiania. The animals are rather active, swimming about in the water with considerable speed.

*Distribution*.—France, Holland, Belgium,



Gen. 27. **Cypridopsis**, Brady, 1866.

*Generic Characters.*—Shell of somewhat varying shape in the different species, but, as a rule, far less tumid than in *Pionocypris*. Valves only slightly unequal, the right being however a little larger than the left, and overlapping it in front by a narrow pellucid border; surface more generally rough by numerous densely set impressed pits, and in some cases armed with stout spines. Antennæ well adapted for swimming, but comparatively less strongly built than in *Pionocypris*. Maxillæ with the masticatory lobes narrowly produced; palp rather feeble, with the distal joint narrow and longer than broad. Maxillipeds with the palp comparatively short, and in male prehensile; vibratory plate more or less reduced. Anterior legs more slender than in *Pionocypris*. Caudal rami very small and of a structure similar to that in the said genus. Copulative appendages of male with the outer lappet boot-shaped. Ejaculatory tubes with numerous whorls of radiating spikes, proximal extremity truncate. Spermatic vessels forming in each valve dense coils both in front and behind.

*Remarks.*—The present genus is here taken in a more restricted sense than done by Brady and most other authors. Indeed the 3 species comprised by Brady, in his genus represent in my opinion as many separate genera, one of them, *C. vidua*, being the type of the genus *Pionocypris* treated of in the preceding pages, and another, *C. villosa*, that of the genus *Cypridopsella* Kaufmann, to be spoken of farther below. It is thus only left in the genus *Cypridopsis* the 3rd species recorded by Brady, viz., *C. aculeata*. Although rather nearly allied to *Pionocypris*, the present genus is well distinguished by the far less tumid shell, and by the right valve (and not the left) being the larger. Moreover slight differences are to be found in the structure of some of the appendages.—The genus is represented in the Fauna of Norway by only a single species, to be described below; but in other parts of the world numerous species referable to this genus have been recorded.

61. **Cypridopsis aculeata**. (Costa).

(Pl. LXV., fig. 3).

*Cypris aculeata*, Costa, Fauna del regno di Napoli.

*Specific Characters.*—*Female*. Shell, seen laterally, broadly oval or somewhat trigonal in shape, greatest height in the middle and nearly attaining  $\frac{2}{3}$  of the length, dorsal margin boldly arched and almost angular in the middle, sloping rather steeply both in front and behind, ventral margin distinctly sinu-



ated in the middle, anterior extremity well rounded off, posterior somewhat narrower and obtuse at the lower corner;—seen dorsally, oblong ovate in outline, with the greatest width behind the middle and about equalling half the length, anterior extremity gradually narrowed to an obtuse point, posterior rounded off.—Surface of shell distinctly pitted and rough from numerous short and stout spines, being moreover rather densely hairy. Natatory setæ on posterior antennæ finely ciliated and extending somewhat beyond the tips of the apical claws. Vibratory plate of maxillipeds with 4 setæ. Caudal rami very small, with the flagellum twice as long as the stem.

Colour of shell dark bluish green.

Length of adult female 0.72 mm.

*Male* unknown.

*Remarks.*—This form was recorded as early as the year 1852 by Costa and was the following year described by Lilljeborg as new, but with the same specific name as that given to it by Costa. It is easily recognised from our other fresh water Ostracoda by the very dark bluish green colour of the shell and by its spiny armature. In the latter respect it comes however very near to some of the exotic species.

*Occurrence.*—I have taken this form rather abundantly in several places of our country, but always in more or less brackish water. The reproduction seems to be exclusively parthenogenetical, as I have never come across even a single male specimen among the many hundred examined. The animals are rather active, swimming about in the water with great dexterity.

*Distribution.*—Throughout Europe, Island, Central Asia, North and South Africa.

## Gen. 28, *Cypridopsella*, Kaufmann, 1900.

Syn: *Potamocypris*, Alm (not Brady).

*Generic Characters.*—Shell much compressed, more or less reniform in shape and densely hairy. Valves very unequal, the right overlapping the left more or less conspicuously along the dorsal face. Antennæ well adapted for swimming. Maxillæ with the masticatory lobes short and stout, palp rather large with the distal joint spatulate in shape and armed at the end with coarse spines. Vibratory plate of maxillipeds quite rudimentary. Anterior legs rather slender. Caudal rami of a structure similar to that in the 2 preceding genera. Genital lobes of female provided in front with a peculiar hooked process.

*Remarks.*—This genus was proposed in the year 1900 by Kaufmann, and as its type was considered *Monoculus villosus* of Jurine, which by most recent authors had been referred to the genus *Cypridopsis* Brady. Kaufmann, however included in that genus 2 other species which evidently are not congeneric, and which have been described above as members of the genus *Pionocypris*. The present genus is in particular distinguished by the very asymmetrical valves and by the structure of the maxillæ. From the genus *Potamocypris* Brady it differs essentially by the well developed natatory setæ on the posterior antennæ. In addition to the typical species described below, *Cypridopsis smaragdina* Vavra and *Potamocypris maculata* Alm are apparently referable to the present genus.

## 62. *Cypridopsella villosa*, (Jurine).

(Pl. LXVI)

*Monoculus villosus*, Jurine, Hist. des Monocles, p. 178, Pl. XIX, figs. 14, 15.

Syn: *Cypris Westwoodi*, Baird.

• *Cypridopsis villosa*, Brady.

• *Potamocypris villosa*, Alm.

*Specific Characters.*—*Female.* Shell, seen laterally, triangular reniform in shape, greatest height in the middle and about equaling  $\frac{3}{5}$  of the length, dorsal margin boldly arched in the middle and sloping rather steeply both in front and behind, ventral margin deeply sinuated, anterior extremity obliquely rounded, posterior rather narrower and somewhat deflexed, with the lower corner obtuse;—seen dorsally, narrow oblong or lancet-shaped, with the greatest width in the middle and not nearly attaining half the length, both extremities pointed and nearly equal.—Surface of shell finely dotted and clothed with coarse recurved hairs.—Natatory setæ on posterior antennæ finely ciliated and extending somewhat beyond the tips of the apical claws. Maxillæ with the distal joint of the palp broader than long and armed with 4 spines, one of them forming the immediate continuation of the joint; spines on outermost masticatory lobe smooth. Vibratory plate of maxillipeds replaced by 2 small bristles. Caudal rami with the flagellum very slender and about twice as long as the stem. Genital lobes rather large, oblong in shape and somewhat widening in front, hooked process strongly chitinised.

Colour of shell light grass-green.

Length of adult female 0.72 mm.

*Male* unknown.

*Remarks.*—The identity of the above-described form with Jurine's *Monoculus villosus* seems to me to be indoubitable, and has also been admitted

by most recent authors, though Dr. Alm has uttered some doubt thereon. The said author refers this species to the genus *Potamocypris*, Brady (= *Paracypridopsis*, Kaufmann); but this can scarcely be sanctioned, because that genus is characterised by the quite rudimentary condition of the natatory setæ on the posterior antennæ and the consequent want of swimming power.—The very conspicuous asymmetry of the valves renders the present Ostracod easily recognisable from most of our other Cypridæ; but this asymmetry is only apparent in fully grown specimens. In the immature state of the animal the valves are nearly equal (see the fig. given on the plate of such a specimen).

*Occurrence.*—I have taken this form in several places of our country, and as far north as Selsøvik, lying just within the polar circle. It is found in shallow grassy ponds and swamps, and, though more generally keeping at the bottom, the animals are seen at times swimming rather quickly about in the water. All the specimens examined by me were of the female sex, and I do not have any notice of the male of this form having ever been observed.

*Distribution.*—Throughout Europe, Central Asia, (?) South America.

## Subfam. 5. Darwinulinæ.

*Remarks.*—This subfamily only comprises a single genus, *Darwinula*, which by most authors has been recorded as the type of a distinct family of the suborder Podocopa. Yet referring the reader to the considerations set forth in the earlier parts of the present Volume and to my proposal of only admitting 2 real families of the Podocopa, I have found it more appropriate to record this genus as the type of only a subfamily, which I have felt justified to class within the family Cypridæ, as here defined. True, the Cyprid characters would seem so be somewhat less clearly manifested in this subfamily than in most of the preceding ones; but yet I think that there is full evidence of its nearer approach to the Cyprid than to the Cytherid type. The characters of the genus given below will, I think, show this more clearly.

### Gen. 29. *Darwinula*. Brady & Norm. 1889.

Syn: *Polycheles*, Brady.

„ *Darwinella*, Brady.

*Generic Characters.*—Shell more or less cuneate in shape, narrowed in front, expanded behind. Valves thin and pellucid, smooth, without any obvious sculpture, inner duplicatures narrow; muscular spots rather in front of the middle,



and arranged in form of a rosette. A single eye present. Antennæ not adapted for swimming, both pairs remarkably short and stout, the anterior ones 6-articulate, with the terminal part not sharply marked off from the basale one, and armed with strong spiniform setæ; the posterior ones with a small bisetose exopodal lobule at the end of the basal part, terminal part 3-articulate, 1st joint the largest and provided behind with a group of small sensory threads, penultimate joint, as in other Cypridæ, produced at the end in front to a claw-bearing prominence. Anterior lip lamellarly produced in front. Mandibles with the cutting edge straight and finely dentate, palp large geniculate, 3-articulate, basal joint provided inside with a pectinate row of slender ciliated setæ, and in front with a small vibratory plate edged with short setæ. Maxillæ with the masticatory lobes short and stout, proximal joint of palp thickened and produced in front, distal joint small; vibratory plate large and broad. Maxillipeds produced in front to a well developed masticatory lobe, and provided outside with a rounded vibratory plate edged with numerous setæ; palp pediform, 3-articulate. Legs elongate, both pairs of similar structure, the posterior ones however, as a rule, extended backwards and somewhat upwards within the cavity of the shell. Caudal rami quite absent, the body terminating in a simple conical process. Ripe ova received within the posterior roomy part of shell-cavity for further development.

*Remarks.*—This genus was established in the year 1870 by Brady and Robertson; but as the name *Polycheles* proposed had been preoccupied, it was subsequently (in 1872) changed to *Darwinella*, and again in 1889 to *Darwinula*, because also the name *Darwinella* had turned out to be preoccupied. The genus as yet only comprises 2 species; but I have had an opportunity of examining one or 2 additional species from South America (Peru). Only the type species is represented in the Fauna of Norway.

### 63. *Darwinula Stevensoni* (Brady & Robertson).

(Pl. LXVII).

*Polycheles Stevensoni*, Brady & Robertson. Ann. Mag. Nat. Hist. ser. IV, Vol. VI, pag. 25, Pl. VII, figs. 1—7, Pl. X, figs. 4—14.

Syn: *Argilloecia aurea*, Brady & Robertson.

„ *Darwinella Stevensoni*, Brady & Robertson.

„ *Darwinula improvisa*, Turner.

„ — *aurea*, G. W. Müller.

*Specific Characters.*—*Female.* Shell, seen laterally, narrow cuneiform in shape, gradually tapered in front, greatest height far behind and about equal to  $\frac{2}{5}$  of the length, dorsal margin almost straight and gently sloping in front,



ventral margin very slightly sinuated and curving evenly upwards behind, anterior extremity narrowly rounded, posterior much broader and somewhat obliquely blunted, more prominent above;—seen dorsally, elongate ovale or lanceolate in outline, with the greatest width behind, and about equalling the height, anterior extremity gradually narrowed to an obtuse point, posterior obtusely rounded off.—Valves slightly unequal, the right somewhat encompassing the left in the posterior part; surface smooth and polished, with a pearly lustre, and almost bare from hairs; muscular spots 9 in number, somewhat wedge-shaped and arranged regularly around a common centre. Eye well marked and occurring far in front.

Colour of the shell whitish pellucid, with a dark patch just above the muscular spots.

Length of adult female 0.72 mm.

*Remarks.*—This remarkable form is easily recognised from any of our other freshwater Ostracoda by the narrow cuneiform shape of the shell, and still more by the anomalous structure of the several appendages. The form recorded by Turner from North America, under the name of *D. improvisa*, is certainly identical with the present species.

*Occurrence.*—The only place, where I have met with this Ostracod is in the lower part of the Vansjø near Moss. It occurred here occasionally on a muddy bottom, at a depth of about 2 fathoms. The specimens were not easy to detect, as they were mostly hidden within the mud, through which they move very slowly, chiefly by the aid of their powerful antennæ. All the specimens captured were of the female sex, and were mostly laden with ova and embryos in their shell-cavity. Brady has also observed the male, and has given a figure of the copulative appendages, no other structural details being however noted.

*Distribution.*—Sweden, British Isles, France, Switzerland, North America.

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## Fam. 2. Cytheridæ.

*Characters of the family.*—Shell much varying in shape and structure, but more generally of rather firm consistency, more or less calcareous, and not seldom roughly sculptured. Valves, as a rule, not much unequal, and connected dorsally by a more or less perfect hinge; muscular spots arranged in a vertical row. 2 eyes generally present, in some cases however confluent

or quite wanting. Antennæ never adapted for swimming, the anterior ones generally sub-pediform and geniculate, like the posterior, the geniculation occurring between the 2 segments of the basal part, the distal of which is always powerfully developed, terminal part having the number of joints more or less reduced and clothed with scattered setæ often mingled with strong spines. Posterior antennæ provided at the end of the basal part with a long rod-like flagellum, curving downwards in front of the terminal part, and containing the efferent duct of a gland lying on each side of the front part of the body, terminal part generally 3-articulate, 1st joint short, and without any sensory appendages behind or any fascicle of setæ at the extremity, penultimate joint never, as in the Cypridæ, produced at the end in front to a claw-bearing process. Mandibles and maxillæ on the whole built on the same type as in the Cypridæ, though in some few cases (*Paradoxostoma*) conspicuously transformed. 3 pairs of ambulatory legs present, all of a rather similar structure and freely projecting from the shell, the anterior pair answering to the maxillipeds in the Cypridæ, but never partaking in the mastication, nor provided with any true vibratory plate. Caudal rami rudimentary and quite immobile. Germinal part of genital organs not lodged within the valves. Ejaculatory tubes absent. Copulatory appendages more or less complicated. Brush-like ventral appendages always present in male.

*Remarks.*—This family comprises a vast number of various forms, both fossil and recent, all of which originally were referred to a single genus, *Cythere*. The far greater bulk of them, are strictly marine, only a comparatively small number of forms being found in fresh water, and some few species exclusively in brackish water. They all are of comparatively small size, seldom exceeding a length of 1 millimeter and, as a rule, very much smaller. Owing to this circumstance, and to the specimens being in most cases picked up from dried material, the examination of the species has more generally been confined to the shell alone. Indeed, previous to my account in 1865, only a few of the more common littoral forms had been subjected to an anatomical examination of the enclosed animal, and it was supposed that the structural details in the other Cytheridæ were of a quite similar kind. On a careful examination of the limbs in the various forms observed by me off the Norwegian coast, I found so many essential differences in their structure, that a subdivision of the genus *Cythere* into several distinct genera appeared to me quite necessary. 14 such genera were of course established, and characterised in my account, both according to the structure of the shell and to that of the limbs. Of these genera 3 had been previously proposed, but only founded on fossil shells, and a 4th genus



(*Paradoxostoma*) had been established by S. Fischer on account of some perplexing peculiarities found in the structure of the oral parts. All these genera have been admitted by subsequent authors, and their number has in recent time been still more increased, especially by G. W. Müller, amounting at present to about 30 in all. Owing to this considerable number of genera, it would seem to be very desirable, that a grouping of them within subfamilies should be effected, as done in the family Cypridæ, and indeed some slight attempt to do so has been made by a few authors. Thus in the year 1889 Brady and Norman discarded wholly from the other Cytheridæ the genus *Paradoxostoma* of Fischer as the type of a distinct family, *Paradoxostomatidæ*. G. W. Müller has accepted this group, but rightly reduce its systematic rank to that of a subfamily of the Cytheridæ. The said author mentions also another subfamily under the name of *Cytherurinae*, but the exact limits of this subfamily is not clearly indicated, nor has any further subdivision of the family been effected. I have endeavoured in the present Account to carry out the classification of the present family in a more complete manner, grouping the several genera into 7 subfamilies, the characters of which will be exposed in the sequel.

### Subfam. 1. Limnocytherinae.

*Characters of the subfamily.*—Shell in most cases of rather feeble consistency, scarcely at all calcareous, and only faintly sculptured. Hinge imperfect. Valves subequal, with the marginal zone crossed by scattered simple pore-channels. Only a single eye present, as in most Cypridæ.—Both pairs of antennæ distinctly geniculate and subpediform; the anterior ones with the terminal part firmly connected with the distal segment of the basal part, and generally composed of 3 joints armed with scattered spiniform setæ. Posterior antennæ with the flagellum well developed in both sexes. Mandibular palp short and stout, distinctly triarticulate and having the vibratory plate rather fully developed. Legs not much different in length and generally of same appearance in the 2 sexes. Caudal rami of somewhat different structure in the different genera.

*Remarks.*—The Cytherids comprised within this subfamily are all true freshwater forms, and have generally been referred to a single genus, *Limnocythere*. Kaufmann has however distinguished another scarcely allied genus *Leucocythere*, and a 3rd genus, apparently referable to the same subfamily, has recently been established by the present author under the name of *Gom-*

*Limnocythere* (*Limnocytherinae* in MS Syst List  
written *Limnocythere* (-inae))

*phocythere*, to include 2 South African species. Besides by their confinement to fresh water, the forms comprised within the present subfamily distinguish themselves from most other Cytheridæ by the thin corneous shell, the imperfectly developed hinge, and by the presence of only a single eye, as in most of the Cypridæ.

### Gen. 30. *Limnocythere*, Brady, 1866.

*Generic Characters*.—Shell more or less reniform in shape and rather tumid, in some cases provided with tuberculiform lateral prominences. Valves thin and fragile, with the surface smooth or obscurely reticulate, and only sparingly hairy at each extremity; inner duplicatures comparatively narrow. Anterior antennæ with the terminal part triarticulate, last joint very narrow and prolonged. Posterior antennæ with 3 apical claws, all issuing from the terminal joint; flagellum distinctly biarticulate. Vibratory plate of mandibular palp with 7 setæ, 5 apical and 2 lateral. Masticatory lobes of maxillæ comparatively short, palp with the distal joint small, quadrangular in shape, and having one of the apical spines, claw-like. Legs moderately slender, with 2 well-developed setæ on the anterior edge of the basal part, apical claw of last pair much prolonged in male. Caudal rami well defined at the base and more or less conical in shape, with one apical and one lateral bristle. Copulative appendages of male with the basal part very large and protuberant in front, terminal part comparatively small, and very sharply marked off from the basal one.

*Remarks*. — This genus was established in the year 1866 by Brady, to comprise 2 genuine fresh water species formerly referred to the genus *Cythere*. The genus was characterised by that author chiefly by the thin and fragile shell, and by the uniform appearance of the spiniform setæ on the anterior antennæ. Several species referable to this genus have in more recent times been recorded, both from Europe and from other continents. Two of these species are represented in the Fauna of Norway and will be described in the sequel.

#### 64. *Limnocythere sancti-patricii*, Brady & Robertson.

(Pl. LXVIII, Pl. LXIX, fig. 1.)

*Limnocythere sancti-patricii*, Brady & Robertson.

Ann. Mag. Nat. Hist., ser. IV, Vol. III, p. 17.

Pl. XVIII, figs. 8—11; Pl. XXI, fig. 4.

*Specific Characters*.—*Female*. Shell seen laterally, oblong reniform in shape, scarcely higher in front than behind, greatest height about equalling half the length, dorsal margin nearly straight or very slightly concaved in the



middle, forming in front, just above the eye, an obtuse angle, and curving behind evenly to the posterior extremity, ventral margin deeply sinuated in the middle, anterior extremity broadly rounded off, posterior a little narrower and likewise evenly rounded;—seen dorsally, broadly ovate or somewhat rhomboid in outline, with a slight constriction in the middle bounded anteriorly by an obtuse prominence, greatest width behind and somewhat less than the height, both extremities acutely pointed, the anterior narrower than the posterior. Valves thin and pellucid, with the edges quite smooth, surface faintly reticulated and provided at each extremity with scattered hairs. Anterior antennæ with the distal segment of the basal part rather dilated and finely ciliated in front, terminal part almost twice as long, with the last joint very narrow and prolonged, linear, bearing on the tip 3 setæ, the innermost one bifurcate. Posterior antennæ with the apical claws rather slender and successively diminishing in length posteriorly. Caudal rami directed downwards and somewhat club-shaped, with the apical bristle scarcely longer than the lateral one. Genital lobes heart-shaped, slightly lobular below.

*Male* of rather larger size than female, and having the shell narrower and more elongated, with the ventral margin more deeply sinuated and the posterior extremity more expanded. Copulative appendages very large, with the basal part oval pyriform in shape, produced in front to an obtusely conical prominence, and exhibiting inside several variously formed highly chitinated processes; terminal part issuing from about the middle of the lower side of the basal one, and having the form of a thin plate divided into 3 unequal lobules.

Colour of shell in both sexes light yellowish brown, antennæ and legs bright yellow.

Length of adult female 0.79 mm, of male 0.82 mm.

*Remarks.*—This species was first described in the year 1869 by Brady and Robertson, and has subsequently been observed by several other authors. It is easily recognised from the other species of the present genus by its comparatively large size and by the shape of the shell in the 2 sexes.

*Occurrence.*—The only place where I have hitherto met with this form, is in our greatest lake, Mjøsen, at Hamar. It occurred here on a woody bottom, at a depth of 2—3 fathoms. Males specimens were almost as frequent as females, and could readily be distinguished from the latter by the rather different shape of the shell. The animals crawl slowly on the bottom in the usual manner of other Cytheridæ.

*Distribution.*—Sweden, British Isles, Bohemia, Hungary, Switzerland.

*Fossil.*—Sweden, England.

65. *Limnocythere inopinata*, (Baird).

(Pl. LXIX, fig. 2.)

*Cythere inopinata*. Baird, British Entomostraca, p. 172, Pl. XX, fig. 1, 1 a—c.Syn: *Limnocythere incisa*, Dahl.

*Specific Characters.*—*Female*. Shell, seen laterally, oval quadrangular or short reniform in shape, greatest height exceeding somewhat half the length, dorsal margin almost straight and horizontal, forming in front, above the eye, a slight indication to an angle and joining the hind edge by an abrupt curve, ventral margin deeply sinuated in the middle and rather bowed at the posterior corner, both extremities broadly rounded off, the posterior a little broader than the anterior; — seen dorsally, more or less irregularly ovate in outline and somewhat constricted in the middle, anterior extremity narrowly pointed, posterior more obtuse. Valves in most cases (but not always) provided with 2 very conspicuous obtuse protuberances, best seen in the dorsal aspect of the shell, the one occurring a little behind the middle and near the ventral face, the other, somewhat larger, placed more behind and more approximate to the dorsal face; anterior and posterior edges finely denticulated, the denticles being rather more conspicuous on the hind edge; marginal zone rather broad and crossed by scattered striæ. Structure of the several appendages very like that in the preceding species. Caudal rami however somewhat different, being conical in shape and directed more forwards, with the apical bristle much prolonged. Genital lobes very small, reniform in shape.

Colour of shell whitish pellucid, with a slight bluish or yellowish tinge.

Length of adult female 0.62 mm.

*Male* unknown.

*Remarks.*—This form was described and figured as early as the year 1850 by Baird as a species of *Cythere*, and may properly be regarded as the type of the present genus. It is of smaller size than the preceding species, and moreover easily distinguished by the shorter and more regularly quadrangular shape of the shell, the distinctly denticulated posterior edge of the valves, and in most cases also by the very conspicuous lateral protuberances, which give to the shell a rather irregular appearance. These protuberances are however in some cases much reduced or may even be quite absent, and this has led to the establishment of a spurious species, viz. *L. incisa*, Dahl.

*Occurrence.* I have taken this species occasionally in 2 small tarns near Christiania, and moreover rather abundantly in a grassy swamp at Tjøtø, on the Nordland coast. The specimens taken in the neighbourhood of Christiania

were all provided with strongly marked lateral protuberances, whereas those found at Tjøtø were mostly missing such protuberances, and thus agreeing with the form recorded by Dahl under the name of *L. incisa*. On a closer examination of the specimens collected in the latter locality I have found in some of them distinct traces of protuberances in the same places as in the typical form, and as no other differences could be detected between the 2 forms, I am now of opinion that they should be combined in one species. All the specimens observed were of the female sex.

*Distribution*.—Sweden, British Isles, Baltic, Germany, Switzerland.

*Fossil*.—Sweden, Scotland.

## Subfam. 2. Cytherideinæ.

*Characters of the subfamily*.—Shell, as a rule of firm consistency, more or less calcareous, with the surface generally distinctly sculptured. Hinge more perfect than in the *Limnocytherinæ*, though wanting distinct closing teeth in front and behind. Eye distinctly divided, in some cases absent. Antennæ built on the same type as in the preceding subfamily. Mandibular palp more slender, with the first 2 joints confluent, vibratory plate less perfectly developed. Legs successively increasing in length, with only a single seta on the anterior border of the basal part, being, as a rule, conspicuously transformed in male. Caudal rami extremely small, and imperfectly defined at the base.

*Remarks*.—This subfamily is established to comprise the genus *Cytheridea* Bosquet and allied forms, which seem to me to present some particular characters distinguishing them both from the *Limnocytherinæ* and from the next subfamily, *Cytherinæ*. 4 genera referable to this subfamily will be treated of in the sequel.

Gen. 31. *Cytherissa*, G. O. Sars, n.

Syn: *Chyteridea* (part).

*Generic Characters*.—Shell club-shaped, very solid, with the surface roughly sculptured. Valves subequal, with the marginal zone thickened and the inner duplicatures narrow. Hinge showing slight traces of closing teeth in front and behind, but without any crenulation of the edges. Eyes well defined, though rather approximate. Antennæ powerfully developed; the anterior ones with the terminal part 3-articulate and armed in front with 3 claw-



like spines; the posterior ones with the flagellum well developed, and with 3 apical claws on the terminal joint. Vibratory plate of mandibular palp more fully developed than in the other genera. Maxillæ with the masticatory lobes rather short and stout. Legs comparatively robuste, with a slight rudiment of a proximal bristle on the front edge of the basal part, and with the seta on the infero-posteal corner remarkably developed. Caudal rami forming 2 oval thickened pieces placed vertically, and each provided behind with 2 extremely small simple bristles. Genital lobes remarkably produced below. Reproduction exclusively parthenogenetical.

*Remarks.*—This new genus is established, to include the form at first recorded by the present author as *Cythere lacustris*, and subsequently generally referred to the genus *Chyteridea* of Bosquet. On a closer examination of the said form, I have found it to present some rather notable particularities distinguishing it both from *Cytheridea* and from the nearly-allied genus *Cyprideis*, and have therefore felt justified to keep it apart from both these genera as the type of a separate genus.

# 66. *Cytherissa lacustris*, G. O. Sars.

(Pl. LXX.)

*Cythere lacustris*, G. O. Sars, Zool. Reise i Sommeren 1882, p. 30.

Syn: *Cytheridea lacustris*, Brady.

" *Acanthopus resistans*, Vernet.

" *Cyprideis torosa*, Jones (part).

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally, oval subtriangular or somewhat clavate in shape, much higher in front than behind greatest height about equalling  $\frac{3}{5}$  of the length, dorsal margin forming above the eyes a gibbous prominence, thence sloping obliquely backwards and joining the hind edge by an abrupt bend, ventral margin slightly sinuated in front of the middle and curved evenly upwards behind, anterior extremity broadly rounded off, posterior much narrower and obtusely blunted at the end;—seen dorsally, irregularly oval in outline, with the sides waved, greatest width about half the length, both extremities obtuse at the end and nearly equal. Surface of shell very uneven, exhibiting on each side 3 or 4 more or less conspicuous obtuse protuberances and on the ventral face a number of irregularly waved longitudinal ridges. Valves very solid and but little pellucid, being sculptured with densely set irregular pittings and scattered tubercles, each composed of a group of small nodules; marginal zone very narrow and indistinctly striated, edges smooth and clothed with fine hairs. Anterior antennæ with the basal



segments considerably expanded, terminal part scarcely longer than the distal segment, and having the 3 articles of about equal length. Posterior antennæ with the apical claws slender and successively diminishing in length behind. Vibratory plate of mandibular palp oblong quadrangular in shape and edged with 5 setæ 3 apical and 2 much smaller lateral. Legs with the basal seta very coarse and densely hairy, apical claw almost straight. Genital lobes terminating below in a rounded lappet.

Colour of shell dark brownish, limbs bright yellow.

Length of adult female amounting to 0.95 mm.

*Remarks.*—This form was described as early as the year 1863 by the present author as a species of *Cythere*, and was subsequently referred by Brady to the genus *Cytheridea* Bosquet. It has generally been regarded as nearly allied to *Cyprideis torosa* Jones, and indeed G. W. Müller records it only as a variety of that species. This is certainly quite erroneous. The present form is in reality so considerably different, that in my opinion it cannot even be placed in the same genus with it.

*Occurrence.*—I have taken this form rather abundantly in several of our larger lakes, for instance in Mjösen, Tyrifjord, Aarungen, Nöklevand etc., and have also met with it in one of our mountain lakes, viz., in Afsiö, on the high-plateau of Dovre. It occurs generally in a depth of some fathoms, on a muddy bottom, along which the animals crawl slowly in the usual manner of the Cytheridæ. Though I have examined carefully many hundreds of specimens from different localities, I have never come across any male, and the same absolute want of this sex has also been ascertained by other authors. It would thus seem to be sufficiently proved, that the reproduction of the present form, unlike what is generally the case with Cytheridæ, is exclusively parthenogenetical.

*Distribution.*—Sweden, British Isles, Switzerland.

*Fossil.*—Scotland.

## Gen. 32. *Cyprideis*, Jones, 1856.

Syn: *Cytheridea*, auctorum (part).

*Generic Characters.*—Shell of somewhat various shape, rather solid, and distinctly sculptured, in some cases provided with lateral protuberances. Valves somewhat unequal, the right one armed at the infero-posteal corner with a denticiform process, marginal zone densely striated. Hinge exhibiting a more or less distinct crenulation of the edges. Eyes distinctly separated. Anterior antennæ about as in *Cytherissa*; posterior comparatively less robust, and only

provided with 2 apical claws. Vibratory plate of mandibular palp less fully developed than in *Cytherissa*. Legs of right series in male conspicuously transformed, 1st leg distinctly prehensile, 2nd leg with the terminal part very feeble, though apparently 3 articulate. Caudal rami extremely small, in form of 2 thin bisetose lamellæ. Genital lobes likewise very small and not produced below. Ripe ova received within the shell-cavity for further development.

*Remarks.*—This genus, proposed by Jones, has by most recent authors been rejected, and regarded as identical with *Cytheridea* Bosquet. I think however that the genus ought to be supported, though it is here taken in a sense somewhat different from that formerly adopted by me. It differs from the preceding genus in the general appearance and sculpture of the shell, as also somewhat in the structure of the appendages, and very essentially in the fact, that the ripe ova are received within the shell-cavity for further development. The peculiar transformation of the legs in the male is a character, which this genus shares with the succeeding one. The type of the present genus is *C. torosa* Jones, a species closely allied to that described below.

#### 67. *Cyprideis littoralis*, Brady.

Pl. LXXI, Pl. LXXII, fig. 1.

*Cytheridea littoralis*, Brady, Nat. Hist. Trans. Northumb. and Durham, Vol. III, p. 6.

Syn: *Cytheridea torosa*, Brady (not Jones).

„ *Cyprideis torosa*, G. O. Sars (not Jones).

„ *Cytheridea torosa*, var. *teres*, Brady & Norm.

*Specific Characters.*—*Female.* Shell, seen laterally, oval reniform in shape, almost equally high behind as in front, greatest height exceeding somewhat half the length, dorsal margin nearly straight in the middle and joining the hind edge by a quite even curve, being more abruptly bent in front, with a slight indication to an angle above the eyes, ventral margin scarcely at all sinuated, anterior extremity well rounded off, posterior obtusely blunted;—seen dorsally, oblong ovate in outline, slightly constricted in the middle, with the greatest width far behind and about equalling half the length, anterior extremity obtusely pointed, posterior much broader and blunt at the end. Surface of shell evenly convex, without lateral protuberances, but of a dull appearance, being marked with closely set rounded pittings; marginal zone of the valves closely striated: right valve produced at the infero-posteal corner to a short dentiform projection pointing backwards, edges otherwise quite smooth and finely hairy. Anterior antennæ with the terminal part about as long as the distal segment of the basal one, middle joint scarcely longer than the 1st.



Flagellum of posterior antennæ well developed. Vibratory plate of mandibular palp rounded in shape and edged with 5 setæ. Legs slender and considerably increasing in length behind. Posterior part of body flattened, spoon-shaped and terminating in an upturned spiniform projection.

*Male*.—Shell comparatively more elongate and more evenly compressed than in female, being distinctly higher in front than behind, with the posterior extremity much less tumid and, seen laterally, obliquely rounded. Right 1st leg distinctly prehensile, with the terminal joint considerably thickened and evenly curved; seta of 1st joint transformed to a strong curved spine with a small bristle outside, apical claw very powerful. Right 2nd leg with the terminal part scarcely longer than the basal one, and of very feeble consistency, without any armature whatever. Right 3rd leg with a dense brush of hairs on the 1st joint of the terminal part. Copulative appendages with the basal part very large and tumid, rounded oval in shape, and sending of inside, at the junction with the terminal part, a highly chitinised rodlike process pointing obliquely forwards, terminal part not sharply defined from the basal one, and of somewhat triangular shape, being produced in front to an acuminate lappet, posterior extremity irregularly rounded.

Colour of shell in both sexes dark brownish; limbs bright yellow.

Length of adult female 1.03 mm., of male 1.10 mm.

*Remarks*.—The above-described form has generally been considered as only a variety of *Cyprideis torosa* Jones. In this view I am not prepared to assent. The form originally described by Jones differs conspicuously by the strongly marked lateral protuberances of the shell, which indeed have occasioned the specific name given to it by its detector. Moreover the shape of the shell is rather different, as seen from the figures given by Brady in his Monograph of post-tertiary Entomostraca. The specific name *littoralis* was assigned to the present form by Brady as early as the year 1868, and must of course be retained for this species.

*Occurrence*.—The only place where I have hitherto met with this form, is in a brackish lake, Engervand, at Sandviken, West of Christiania. It occurred here rather abundantly at the borders of the lake together with *Cypridopsis aculeata*.

*Distribution*.—Baltic, British Isles, Holland, France, Sea of Azow, Central Asia, North Africa.

*Fossil*.—Sweden, Scotland.

68. *Cyprideis sorbyana* (Jones).

(Pl. LXXII, fig. 2).

*Cytheridea sorbyana*, Jones, Monograph of Tertiary Entomostraca, p. 44, Pl. IV, fig. 6.Syn: *Cytheridea dentata*, G. O. Sars.,, — *inermis*, G. O. Sars.

*Specific Characters.—Female.* Shell rather tumid, seen laterally, short subtriangular in shape much higher in front than behind, greatest height nearly equalling  $\frac{2}{3}$  of the length, dorsal margin boldly arched in front of the middle and sloping steeply behind, more slowly in front, ventral margin almost straight, anterior extremity broadly rounded, posterior much narrower, tapering below to an obtuse corner;—seen dorsally, broadly oval in outline, with the greatest width in the middle and about equalling the height, anterior extremity bluntly pointed, posterior obtuse.—Surface of shell slightly hairy and roughly sculptured with concentric ridges and sattered tubercles, anterior edge of valves armed with a row of about 7 denticles, less marked on the left valve; right valve moreover provided, somewhat below the infero-posteal corner, with a very conspicuous blunt spine pointing obliquely downwards, quite absent on the left valve. Anterior antennæ with the terminal part a little longer than the distal segment of the basal one, middle joint almost twice as long as the 1st. Posterior antennæ with the flagellum comparatively feebly developed. Vibratory plate of mandibular palp small, with only 4 setæ.

Colour of shell not yet ascertained.

Length of adult female 0.90 mm.

*Remarks.*—The reference of this form to the genus *Cyprideis* would seem to be somewhat questionable, as it differs conspicuously from the type described above in the shape and sculpturing of the shell. Yet, I have thought it right to place it provisionally in the present genus, as I have found otherwise some evident accordances, thus in the peculiar armature of the right valve with a very conspicuous toothlike process at the infero-posteal corner. My acquaintance with the species was formerly confined to 2 detached valves only, a left and a right, and the strongly marked dissimilarity of these valves led me to the establishment of 2 spurious species, described under the names of *Cytheridea dentata* and *C. inermis*. Brady, however, having had the opportunity of examining a perfect shell, with both valves in situ, could ascertain the perplexing asymmetry of the valves in the present species, which he rightly identified with *Cytheridea sorbyana* described as early as the year 1856 by Jones from fossil shells.



*Occurrence.*—The 2 valves, originally examined by me, were found by my late father in shell-sand from Øxfjord, Finmark. Norman found subsequently some empty shells at Stoksund in the Hardanger-Fjord, and more recently the same author met with this species, in fresh and living specimens, in Kloster Fjord, East Finmark. Some few of these specimens were kindly sent to me, mounted dry, and by moistening them I found in one of the shells most of the limbs tolerably preserved to allow a closer examination. On the accompanying plate figures of these limbs are given; but the posterior part of the body was shrunk, and could not of course be compared with that of the preceding species.

*Distribution.*—British Isles, Spitsbergen, Franz-Josef Land.

*Fossil.*—Norway, Scotland.

### Gen. 33. *Cytheridea*, Bosquet, 1852.

*Generic Characters.*—Shell more or less reniform in shape and rather solid, with the surface evenly convex, without lateral protuberances, but marked with more or less conspicuous flattened tubercles. Valves only slightly unequal, with the edges unarmed; marginal zone rather narrow and densely striated; inner duplicatures broader than in *Cyprideis*. Hinge about as in that genus. Anterior antennæ very robust, with the terminal joint comparatively small. Posterior antennæ with the flagellum reduced in female, apical claws 2 in number. Vibratory plate of mandibular palp small, with the number of setæ reduced. Palp of maxillæ with the distal joint rather prolonged. Legs very distinctly transformed in male; right 1st leg pronouncedly prehensile, with the joints of the terminal part more or less confluent; right 2nd leg with the terminal part reduced to a slight rudiment; left 2nd leg much coarser than in female, subprehensile; right 3rd leg with several bunches of hairs on the 1st joint of the terminal part. Caudal rami and genital lobes about as in *Cyprideis*.

*Remarks.*—This genus is here taken in a more restricted sense than generally admitted, some of the species formerly referred to it being discarded and transferred to the genus *Cyprideis*. As the type of the present genus may be considered *C. papillosa*, Bosquet. The genus is represented in the Norwegian Fauna by 2 well-defined species, to be described below.

69. *Cytheridea papillosa*, Bosquet.

(Pl. LXXIII, Pl. LXXIV, fig. 1.)

*Cytheridea papillosa*, Bosquet, Entom. fossiles des terr. tertiaires de la France, p. 42.

Pl. II, fig. 5 a—d.

Syn: *Cyprideis Bairdii*, G. O. Sars.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong oval or somewhat reniform in shape, scarcely higher in front than behind, greatest height about half the length, dorsal margin almost straight and horizontal, joining the hind edge by an even curve and sloping slowly in front, ventral margin very slightly sinuated, anterior extremity broadly rounded off, posterior obliquely deflexed, terminating below in a somewhat exerted obtuse corner;—seen dorsally, regularly oblong ovate in outline, with the greatest width about equal to the height, anterior extremity pointed, posterior more obtuse.—Surface of shell smooth and shining, slightly hairy at each extremity, and ornamented with scattered very conspicuous rounded tubercles or papillæ of whitish colour. Anterior antennæ very robust, with the distal segment of the basal part considerably expanded and exceeding in length the terminal part, middle joint of the latter only slightly longer than the 1st, last joint about half as long. Posterior antennæ with the spine attached to the end of the penultimate joint posteriorly, claw-shaped, resembling the apical claws. Vibratory plate of mandibular palp with one long plumose apical setæ and 2 much smaller lateral ones.

*Male.*—Shell more elongate than in female, with the ventral margin more deeply sinuated and the hind extremity more obliquely produced. 1st right leg with all the joints of the terminal part coalesced, apical claw very strong and abruptly curved; 2nd right leg with the terminal part reduced to a small simple lamella; 2nd left leg much coarser than in female, with the apical claw falciform curved and denticulated at the end; 3rd right leg with 4 bunches of hairs on the 1st joint of the terminal part. Copulative appendages with the basal part obliquely oval in shape, terminal part rather large, slightly bilobed, anterior lobe triangular, posterior much broader and somewhat boot-shaped.

Colour of shell light reddish brown clouded in some places with a dark violet hue; limbs yellow-coloured.

Length of adult female 0.95 mm., of male 1.20 mm.

*Remarks.*—This form was described as early as the year 1850 by Bosquet from fossil tertiary shells, and has subsequently been observed in recent state by several authors. It is easily recognised by its smooth, reddish brown coloured shell and by the very conspicuous opaque whitish papillæ on its surface.

At first I erroneously referred it to the genus *Cyprideis* and described it as new under the name of *Cyprideis Bairdii*.

*Occurrence*.—This is one of our commonest Cytheridæ, being found rather abundantly around the whole of the Norwegian coast in moderate depths. It shares with some other Cytheridæ the particularity that, when coming in contact with the air, it remains floating on the surface, and may thus be easily picked up from the samples examined.

*Distribution*.—British Isles, Iceland, Greenland, Spitsbergen, Gulf of St. Lawrence, Franz-Josef Land.

*Fossil*.—France (tertiary), Norway (glacial and postglacial), Scotland, Canada.

#### 70. *Cytheridea punctillata*, Brady.

(Pl. LXXIV, fig. 2.)

*Cytheridea punctillata*, Brady, Ann. Mag. Nat. Hist. Vol. XVI, p. 189. Pl. XXVIII, figs. 17—20.

Syn: *Cyprideis proxima*, G. O. Sars.

*Specific Characters*.—*Female*. Shell, seen laterally, subovate or somewhat triangular in shape, much higher in front than behind, greatest height considerably exceeding half the length, dorsal margin boldly arched in front, with indication of an angle above the eyes, thence sloping gently behind and joining the hind edge by an even curve, ventral margin very slightly sinuated, anterior extremity broadly rounded, posterior much narrower and somewhat obliquely blunted, with the lower corner scarcely exerted and obtuse;—seen dorsally, regularly oblong oval in outline, with the greatest width about half the length and both extremities bluntly pointed. Surface of shell of a dull appearance, being marked everywhere with closely set small rounded pits, and moreover exhibiting a number of tubercles or papillæ, which however are of smaller size and less conspicuous than in the preceding species; extremities finely hairy. Anterior antennæ less robust, with the distal segment of the basal part scarcely longer than the terminal part, middle joint of the latter more prolonged, last joint very small. The other appendages of a structure very similar to that in the preceding species.

*Male*.—Shell considerably more elongate than in female, with the greatest height scarcely exceeding half the length. Right 1st leg less powerfully developed than in *C. papillosa*, with the 1st joint of the terminal part well defined and armed at the end anteriorly with a strong spine, the other 2 joints confluent; apical claw far less strong. Right 2nd leg exactly of same appearance as in the said species. Left 2nd leg likewise rather similar, though somewhat less powerful. Copulative appendages with the basal part rounded quadrangular



in shape, terminal part (comparatively short and produced at each extremity, anterior lappet obtuse at the end, posterior acuminate.

Colour of shell dull brownish, limbs bright yellow.

Length of adult female 0.75 mm., of male 0.81 mm.

*Remarks.*—The present species is nearly allied to *C. papillosa*, but easily distinguished by the somewhat different shape of the shell, the surface of which is of a much more dull appearance, with the papillæ far less conspicuous. It was described by me in the year 1865 under the name of *Cyprideis proxima*; but both the generic and the specific names are to be changed as above.

*Occurrence.*—This species is rather common in the upper part of the Christiania Fjord, and I have also taken it in several other places on our coast, up to the Lofoten islands. Norman has recorded it is far North as Vadsö, East Finmark, and the distribution of this form around the whole of the Norwegian coast is thus ascertained. It occurs generally in depths of 6—20 fathoms on a muddy bottom, often associated with *C. papillosa*. Owing to the more firm consistency of the shell, it is never found, like the last named species, floating on the surface of the water.

*Distribution.*—British Isles, Iceland, Baffins Bay, Spitsbergen, Bay of St. Lawrence, Franz Josef Land.

*Fossil.* Norway, British Isles (glacial and postglacial).

### Gen. 34. **Eucythere**, Brady 1866.

Syn: *Cytheropsis*, G. O. Sars.

*Generic Characters.*—Shell more or less triangular in shape, much higher in front than behind, and rather compressed in its anterior part. Valves thin and pellucid, with the surface evenly convex and adorned with scattered more or less conspicuous flattened tubercles or papillæ, as in *Cytheridea*; hinge rather imperfect; inner duplicatures comparatively broad anteriorly; marginal zone broad, and crossed by distant pore-channels, edges smooth with scattered hairs. Eyes coalesced. Anterior antennæ less robust than in *Cytheridea*, with the terminal joint more prolonged. Posterior antennæ with the flagellum well developed in both sexes. Vibratory plate of mandibular palp very small. Maxillæ with the innermost masticatory lobe much reduced, palp with the distal joint long and narrow. Legs rather feeble, not transformed in male. Brush-like male appendages peculiarly developed.

*Remarks.*—This genus was established in the year 1865 by the present author; but as the name *Cytheropsis* proposed had been preoccupied, it was



the following year replaced by Brady with that of *Eucythere*. The genus presents some characters in common with *Cytheridea*, yet differing conspicuously in the shape and thin consistency of the shell, as also in some of the other structural details. The extraordinary development of the brush-like male appendages is a character quite peculiar to the present genus and scarcely found in any other of the Cytheridæ. Another character by which this genus differs from the other genera comprised within the present subfamily is the want of any transformation of the legs in the male sex. The genus as yet only comprises the 2 species described below.

### 71. *Eucythere argus*, G. O. Sars.

(Pl. LXXV, fig. 1).

*Cytheropsis argus*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 58.

*Specific Characters.*—*Female*. Shell, seen laterally, oblong triangular in shape, greatest height somewhat in front of the middle and not fully attaining half the length, dorsal margin strongly arched in the middle and sloping gradually to each extremity, more steeply behind, ventral margin slightly sinuated, anterior extremity broadly rounded, posterior much narrower and blunted at the end;—seen dorsally, oblong ovate in outline, greatest width far behind and about equal to the height, anterior extremity tapering to an acute point, posterior much broader and obtuse at the end. Surface of shell adorned with a number of very large and conspicuous rounded tubercles or papillæ of an opaque whitish colour, and clothed at each extremity with scattered fine hairs. Anterior antennæ with the distal segment of the basal part unusually prolonged, exceeding in length the terminal part, last joint of the latter about half the length of the middle one. Posterior antennæ with the terminal joint comparatively large, apical claws rather unequal, the posterior much shorter and thinner than the anterior, which is distinctly denticulated at the end in front. Vibratory plate of mandibular palp with 2 setæ only. Maxillæ with the innermost masticatory lobe unisetose, distal joint of palp about as long as the proximal one. Legs only slightly increasing in length posteriorly, seta on the anterior edge of the basal part rather coarse and curving slightly upwards.

*Male*.—Shell much more elongate than in female, with the dorsal margin more evenly curved, and the posterior extremity more narrowly produced.

Colour of shell not yet ascertained.

Length of adult female 0.61 mm., of male 0.64 mm.

*Remarks*.—The present species is easily recognised by the very large and conspicuous opaque white papillæ adorning the surface of the shell, and indeed

the specific name proposed alludes to this ornament, which somewhat resembles that found in *Cytheridea papillosa* (see above).

*Occurrence*.—I have only had an opportunity of examining a single living specimen of this form, found, many years ago, in the upper part of the Christiania Fjord; but several empty shells were picked up by my late father from shell-sand taken at Øxfjord, Finmark.

*Distribution*.—British Isles, Gulf of St. Lawrence.

*Fossil*.—Norway, Scotland, Canada.

## 72. *Eucythere declivis*, (Norman).

(Pl. LXXV, fig. 2).

*Cythere declivis*, Norman, Nat. Hist. Trans. Northumb. & Durham, Vol. 1, p. 16, Pl. V, figs. 9—12.

Syn: *Cytheropsis tenuitesta*, G. O. Sars.

*Specific Characters*.—*Female*. Shell, seen laterally, short triangular in shape, very high in front and rapidly tapered behind, greatest height almost attaining  $\frac{3}{5}$  of the length, dorsal margin gibbously arched in front and sloping rather sleepily behind, ventral margin very slightly sinuated, anterior extremity broadly rounded, posterior narrowly blunted;—seen dorsally, oblong ovate in outline, greatest width behind and much less than the height, anterior extremity tapering to an acute point, posterior obtuse. Valves very thin and pellucid, with the surface finely punctate and provided with scattered rather small papillæ. Anterior antennæ more slender than in the preceding species, with the distal segment of the basal part less prolonged, last joint exceeding half the length of the preceding joint. Posterior antennæ less robust, with the terminal joint smaller, anterior apical claw smooth. Maxillæ with the innermost masticatory lobe bisetose, distal joint of palp longer than the proximal one. Legs more slender than in *E. argus*, and more rapidly increasing in length posteriorly; apical claw very long.

*Male*.—Shell considerably more elongate than in female, seen laterally, narrow clavate in outline, tapering behind to an obtuse corner. Copulative appendages of comparatively simple structure, terminating in a rounded lobe with thickened margins. Brush-like appendages very large, flabelliform, each appendage being expanded at the end to a rounded disc densely edged with curled bristles.

Colour of shell not yet ascertained.

Length of adult female 0.58 mm., of male 0.62 mm.

*Remarks.*—This form was recorded as early as the year 1864 by Norman as a species of *Cythere*, and was described the following year by the present author under the name of *Cytheropsis tenuitesta*. It is easily distinguished from the preceding species, both as to the shape and sculpturing of the shell, and to the structure of the appendages, and I am indeed perplexed to see, that Brady and Norman in one of their more recent papers have suggested these 2 forms to be only varieties of a single species.

*Occurrence.*—I have only seen a few specimens of this species, taken, many years ago, in the upper part of the Christiania Fjord. Norman records it also from Finnmark.

*Distribution.*—British Isles, Bay of St. Lawrence, Franz Josef Land, Mediterranean.

*Fossil.*—Scotland.

### Gen. 35, **Krithe**, Brady & Robertson, 1874.

Syn: *Ilyobates*, G. O. Sars.

*Generic Characters.*—Shell thin and pellucid, though rather firm, with the surface smooth and polished; inner duplicatures of valves very broad in front, marginal zone crossed by scattered, somewhat irregular pore-channels and surrounded in front by a thin hyaline border. Hinge imperfectly developed. Eyes absent. Anterior antennæ with the basal segments very coarse and expanded, terminal part rather movably articulated with the basal one, and very short and compact, armed with slender upwards-curving spines. Posterior antennæ with 3 claws on the terminal joint, flagellum well developed in both sexes. Mandibles with 2 of the cutting teeth much larger than the others, vibratory plate of the palp small, with 2 apical setæ and a rudiment of a lateral one. Maxillæ about as in *Cytheridea*. Legs comparatively short, terminal part of the 2 anterior pairs only composed of 2 joints, by the coalescence of the 2 outer ones; left 2nd leg in male very powerful, subprehensile. Caudal rami and genital lobes about as in *Cytheridea*.

*Remarks.*—This is a rather anomalous genus, and its reference to the present subfamily appears indeed somewhat questionable. Yet, as I do not find a better place for classifying this genus, and as I am unwilling to establish a new subfamily only founded on a single genus, I have preferred to include it provisionably in the subfamily *Cytherideinæ*, with which it agrees at least in one essential character, viz., the partial transformation of the legs in the male sex. The genus was established in the year 1865 by the present



author; but as the name *Ilyobates* proposed had been preoccupied, it was in 1874 replaced by Brandy & Robertson with that of *Krithe*. In addition to the type species described below, a few nearly allied species have been recorded by Brady and by G. W. Müller.

### 73. *Krithe bartonensis*, (Jones).

(Pl. LXXVII).

*Cytherideis bartonensis*, Jones, Tertiary Entomostraca, p. 50, Pl. V, figs. 2, 3.

Syn: *Ilyobates prætecta*, G. O. Sars.

*Specific Characters—Female.* Shell, seen laterally, oblong oval in shape, somewhat higher behind than in front, greatest height about equalling half the length, dorsal margin slightly arched and joining the hind edge by a quite even curve, ventral margin almost straight, anterior extremity well rounded off, posterior rather broader and somewhat obliquely blunted, with the lower corner almost rectangular;—seen dorsally, oblong ovate in outline, tapering in front to a sharp point, posterior extremity blunted and inflexed in the middle; greatest width somewhat less than half the length. Surface of valves without any distinct pittings, but provided with scattered very small tubercles and a few fine hairs at each extremity; marginal zone well marked both in front and below, and of somewhat various width; hyaline border of anterior edge rather broad, and very conspicuous in fresh specimens. Anterior antennæ with the terminal part scarcely as long as the distal segment of the basal part and armed with about 7 spines, 3 of them attached to the middle joint, last joint very short, with 3 spines. Posterior antennæ with the apical claws very slender. Legs with only a single seta on the anterior border of the basal part. Posterior extremity of body blunt at the end.

*Male.*—Shell of rather smaller size than in female and much narrower, seen laterally, almost cylindrical in shape. Left 2nd leg powerfully developed, with the 2 joints of the terminal part considerably thickened, and the apical claw very strong. Copulative appendages with the basal part much expanded, rounded triangular in shape, and sending off below a long rod-like process curving backwards; terminal part comparatively short, and acutely produced both in front and behind.

Colour light yellowish brown, by the translucent body; limbs bright yellow. Length of adult female 0.82 mm., of male 0.76 mm.

*Remarks.*—This peculiar form was recorded as early as the year 1856 by Jones from fossil shells, and referred by him to the genus *Cytherideis*. It was

subsequently observed in the recent state by the present author, and described in 1865 under the name of *Ilyobates prætexta*, both names being however liable to drop. The present Ostracod is easily recognised from the other indigenous Cytheridæ, both by the outwards appearance and by the structure of the appendages.

*Occurrence*.—I have taken this form in several places of our coast, from the Christiania Fjord to the Lofoten islands, and Norman records it also from Finmark (Vadsø). It is generally found in depths of from 20 to 50 fathoms, on a muddy bottom, and is easily detected by the particularity, that when coming in contact with the air, it remains floating on the surface, like the case with *Cytheridea papillosa*. The movements of the animal are rather slow, and during its crawling on the bottom, the anterior antennæ are stroke upwards in a peculiar manner, somewhat like the case with the *Cypridæ*.

*Distribution*.—British Isles, Iceland, Bay of Biskay.

*Fossil*.—Norway, British Isles.

### Subfam. 3. Cytherinæ.

*Characters of the subfamily*.—Shell of very firm consistency, calcareous, with the surface more or less roughly sculptured, in some cases provided with variously formed projections or spines. Hinge generally well developed, with distinct closing teeth in front and behind. Both pairs of antennæ strong, subpediform; the anterior ones with the terminal part 3- or 4-articulate, and armed in front with 2 or 3 clawlike spines intermingled with thin bristles, last joint more or less produced, and in some cases armed with a claw-like spine in addition to the setæ. Legs normally developed and of same appearance in the two sexes.

*Remarks*.—In this subfamily I propose to comprise the more typical Cytheridæ grouping themselves more closely around the genus *Cythere* (sens. strict.). The chief characters distinguishing this subfamily are given in the above short diagnosis. It is by far the most comprehensive of the subfamilies treated of in the present account, both as to the number of genera and as to that of the species.

Gen. 35. **Cythere**, O. Fr. Müller 1785.

*Generic Characters*.—Shell slightly compressed and more or less reniform in shape, with the surface evenly convex, without any projections or spines. Valves somewhat unequal, with the inner duplicatures rather broad; marginal zone well marked and crossed by more or less crowded pore-channels, edges smooth, Hinge with the closing teeth in front and behind well developed. Eyes widely apart. Antennæ robust; the anterior ones with the terminal part triarticulate, middle joint elongate and armed in front with 2 stout claw-like spines; the posterior ones with the apical claws rather short and stout, flagellum well developed in both sexes. Vibratory plate of mandibular palp much reduced. Maxillæ with the masticatory lobes more or less produced, palp comparatively narrow. Legs rather strong and only slightly increasing in length posteriorly, anterior border of basal part with 2 unequal setæ. Caudal lamellæ edged with 3 bristles, 2 apical and 1 lateral. Copulative appendages of male with the terminal part of various shape in the different species.

*Remarks*. The limits of this genus, which originally comprised all the Cytheridæ, have in recent time been considerably succincted by the removal of a number of the forms into distinct genera. But even in the restriction now generally adopted, this genus comprises a vast number of species, both fossil and recent. As however these species, almost in every case, have been examined only from the shell, it is very difficult to decide their true mutual relationship. Some of them look indeed so very different from the type of the present genus, that I am much inclined to believe that they are not at all congeneric; but this cannot properly be settled, except by a careful examination of the limbs. In the present Account I have felt justified, on the base of a thorough anatomical examination, to establish 4 new genera for comprising some species hitherto considered as true members of the genus *Cythere*. In the restriction here adopted, the present genus is represented in the Fauna of Norway by only 3 species, to be described below.

73. **Cythere lutea**, O. Fr. Müller.

(Pl. LXXVII.)

*Cythere lutea*, O. Fr. Müller, Entomostraca, p. 65, Pl. VII, figs 3, 4.Syn: *Cythere reniformis*, Baird.— *setosa*, Brady.

*Specific Characters*.—*Female*. Shell rather compressed, seen laterally, short reniform in shape, greatest height in the middle and almost attaining  $\frac{3}{5}$



of the length, dorsal margin gently arched, terminating both in front and behind with a slight angle, ventral margin deeply sinuated in the middle and curving evenly upwards behind, anterior extremity somewhat obliquely rounded, posterior slightly angulate in the middle;—seen dorsally, oblong ovate in outline, with the greatest width far behind and about equal to  $\frac{2}{5}$  of the length, both extremities obtusely pointed, the anterior much narrower than the posterior.—Valves rather unequal the right one overlapping, the left conspicuously along the dorsal face, surface densely pitted and provided with scattered rounded tubercles, marginal zone rather broad and crossed by somewhat distant pore-channels, anterior and posterior edges clothed with scattered stiff hairs.—Anterior antennæ with the terminal part much longer than the distal segment of the basal part, last joint comparatively small, scarcely exceeding in length  $\frac{1}{3}$  of the middle one, spines of the latter very strong, and denticulated on the outer edge. Posterior antennæ with the flagellum very coarsely developed. Legs comparatively robust. Posterior extremity of body tipped by a highly chitinated spiniform process.

*Male.* Shell comparatively less high than in female, with the dorsal margin nearly straight and the ventral more deeply sinuated. Copulative appendages very large, with the basal part rounded quadrangular in shape, and sending off below a slender process pointing backwards and slightly bilobed at the extremity, being moreover provided inside with a dark-coloured hooked string curving downwards; terminal part produced in front and behind to an acute lappet, the posterior narrower than the anterior.

Colour of shell dark reddish-brown, with the marginal zone lighter, opaque whitish; limbs of a brownish yellow hue.

Length of adult female 0.74 mm., of male somewhat less.

*Remarks.*—This form was described and figured as early as the year 1785 by O. Fr. Müller, and ought to be considered as the type of the present genus. It is easily recognised from most of the other Cytheridæ by the dark reddish brown colour of the shell.

*Occurrence.*—This is one of our commonest Cytheridæ, being found rather abundantly all round the whole of the Norwegian coast in the littoral zone among algæ, and is often left in tidal pools on the beach.

*Distribution.*—British Isles, Kattegat, Iceland, Greenland, Bay of St. Lawrence.

*Fossil.*—Norway, British Isles, Canada.

74. *Cythere albomaculata*, Baird.

(Pl. LXXVIII.)

*Cythere albomaculata*, Baird, British Entomostraca, p. 169, Pl. XX, fig. 7.

*Specific Characters.*—*Female.* Shell seen laterally, oval reniform in shape, greatest height about in the middle and only slightly exceeding half the length, dorsal margin nearly straight in the middle and joining the hind edge without any intervening angle, ventral margin deeply sinuated in front of the middle and slightly curved upwards behind, anterior extremity well rounded off and considerably bowed below, posterior scarcely narrower and slightly angular in the middle;—seen dorsally, oblong fusiform in outline, with the greatest width in the middle and slightly exceeding  $\frac{2}{5}$  of the length, both extremities pointed and nearly equal.—Surface of valves smooth, with scattered rather small tubercles, marginal zone narrower than in *C. lutea*, but crossed by numerous closely set pore-channels, anterior edge, very densely hairy. Antennæ remarkably short and stout, the anterior ones with the terminal part but little longer than the distal segment of the basal part, last joint about half the length of the preceding one, and armed with a rather strong spine resembling those on the middle joint. Mandibular palp with the inner distal seta of the penultimate joint remarkably strong and falciform curved. Maxillæ with the distal joint of the palp shorter than in *C. lutea*.

*Male.*—Shell of rather larger size than in female and much more elongate, with the anterior extremity strongly bowed below and the ventral sinus more sharply marked. Copulative appendages very large, with the basal part rounded oval in shape; terminal part produced in front to a somewhat irregularly curled lappet, but quite obtuse behind.

Colour of shell yellowish gray, irregularly clouded with a darker hue, so as to leave a number of more or less conspicuous lighter areas; limbs dark yellow.

Length of adult female 0.84 mm., of male 0.96 mm.

*Remarks.*—The descriptions and figures given by Baird and most other authors of this species refer only to the male sex. In the female the shell is of a much shorter and stouter shape, more like that of the preceding species, so as easily to be confounded with it. On a closer examination, however, it may readily be distinguished by the closely striated marginal zone of the valves and the dense clothing of hairs in particular on the anterior edges, as also by the very different colour of the shell. In the structural details some well-marked differences from the preceding species are found, as noted in the above description.



*Occurrence*.—This species, though very common off the British Isles, is rather rarely met with on the Norwegian coast. I have only taken a few specimens at Risør, south coast of Norway, in the laminarian zone, and Norman has recorded it, likewise quite occasionally, from Lervik in the outer part of the Hardanger-Fjord.

*Distribution*.—British Isles, Iceland, Bay of Biscay.

*Fossil*.—Scotland.

## 75. *Cythere viridis*, O. Fr. Müller.

(Pl. LXXVIII, fig. 2.)

*Cythere viridis*, O. Fr. Müller, Entomostraca, p. 64, Pl. VII, figs. 1, 2.

Syn: *Cythere cyamos*, Norman.

*Specific Characters*.—*Female*. Shell very short and compressed, seen laterally, rounded quadrangular in shape, somewhat higher in front than behind, greatest height about equal to  $\frac{3}{5}$  of the length, dorsal margin somewhat gibbous in the ocular region and sloping obliquely behind with an almost straight course, ventral margin distinctly sinuated in the middle and curving evenly upwards behind, anterior extremity broadly and somewhat obliquely rounded, posterior a little narrower and obtusely truncated;—seen dorsally, oblong oval in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length, sides nearly parallels in the middle, anterior extremity more narrowly pointed than the posterior. Surface of valves closely punctate, with scattered very small tubercles, marginal zone rather narrow and finely striated, anterior and posterior edges clothed with short hairs. Anterior antennæ with the terminal part twice as long as the distal segment of the basal one, last joint very narrow and produced, being fully as long as the middle one. Legs comparatively more slender than in the 2 preceding species.

*Male*. Shell less high than in female; with the anterior extremity more bowed below and the ventral sinus deeper. Copulative appendages comparatively of smaller size than in the 2 preceding species, with the terminal part evenly rounded off at the end, basal part sending off from its infero-posteal corner a slender process pointing forwards, and provided inside with a freely projecting chitinous string curved in the form of a circle.

Colour of shell light brownish, with a more or less distinct olivaceous tinge; limbs colourless.

Length of adult female scarcely exceeding 0.50 mm., of male about the same.



*Remarks.*—The identity of the above-described form with that originally recorded by O. Fr. Müller seems to me to be indoubitable. Lilljeborg has however described as *Cythere viridis* another very different Cytherid, and for this reason the specific name of the present form was changed by Norman to that of *cyamos*. It is a very small species and may easily be taken for young of *C. lutea*. On a closer examination it is however found to be well distinguished from any of the 2 preceding species, both as to the shell and to the structure of some of the appendages.

*Occurrence.*—This small Ostracod is very common in the upper part of the Christiania Fjord close to the beach among algæ, and I have also taken it in many other places, up to the Finmark coast.

*Distribution.*—Kattegat, British Isles.

*Fossil.*—Norway, Scotland.

Gen. 36. *Leptocythera*<sup>e</sup>, G. O. Sars, n. g.  
Syn: *Cythere auct.* (part).

*Generic Characters.*—Shell, as a rule, narrow and elongated, much compressed, with the valves subequal; surface in some cases roughly grooved, but more frequently smooth and marked with more or less conspicuous pittings; inner duplicatures moderately broad, marginal zone crossed by somewhat distant pore-channels. Hinge well developed. Eyes confluent. Anterior antennæ comparatively short and stout, with the terminal part 3-articulate, carrying in front 3 coarse spines, last joint more or less produced. Posterior antennæ with 2 apical claws; flagellum well developed in both sexes. Mandibular palp rather narrow, with 3 comparatively short and stout spines on the terminal joint; vibratory plate much reduced. Maxillæ with the masticatory lobes rather short; palp of moderate size. Legs, as a rule, rapidly increasing in length posteriorly, basal part with only a single seta on the anterior margin. Caudal lamellæ with 2 rather distant bristles. Copulative appendages of male with 2 backwards-pointing processes below the basal part; terminal part exerted in front and behind to a projecting lappet.

*Remarks.*—In this new genus I propose to comprise a number of species hitherto described as true members of the genus *Cythere*, but differing from that genus, as defined above, by the very narrow and elongated shape of the shell, the wholly confluent eyes, and also by some other particularities in the structural details noted in the above diagnosis. The type of the genus is *Cythere pellucida* Baird, to which several other species subsequently detected

bear a very close affinity, so as to form with it a quite natural group. All the 9 species of *Cythere* recorded by G. W. Müller from the Gulf of Naples are unquestionably referable to the present genus. In the following pages will be described 5 species occurring off the Norwegian coast.

## 76. *Leptocythere pellucida*, (Baird).

(Pl. LXXIX, fig. 1).

*Cythere pellucida*, Baird, British Entomostraca, p. 173, Pl. XXI, fig. 7.

Syn: *Cythere confusa*, Brady & Norman.

*Specific Characters.*—*Female*. Shell, seen laterally, elongate subquadrangular in shape, almost equally high throughout, greatest height not nearly attaining half the length, dorsal margin only very slightly arched, with indication to an angle above the eye, ventral margin distinctly sinuated in front of the middle, anterior extremity obliquely rounded, posterior transversely truncated, with the upper corner somewhat projecting and compressed, lower corner rounded off;—seen dorsally, narrow ovate in outline, with the greatest width far behind and about equal to  $\frac{1}{3}$  of the length, side-edges almost straight and parallel in the middle, anterior extremity sharply pointed, posterior more obtuse. Valves rather thin and pellucid, surface smooth and marked with somewhat irregular pittings more scattered in the anterior part and assuming behind a more or less elongate form, edges clothed in front and behind with fine hairs. Anterior antennæ with the terminal part about the length of the distal segment of the basal part, last joint rather produced, exceeding in length the preceding one. Last pair of legs with the terminal part about twice as long as that of the 1st pair, and armed at the tip, in front of the apical claw, with 3 small spines.

*Male*.—Shell rather more elongate than in female and somewhat higher in front than behind, with the supero-posteal corner more projecting. Copulative appendages with the anterior lappet of the terminal part acutely produced, posterior shorter and obtuse at the tip.

Colour yellowish brown, from the dark translucent body; limbs bright yellow.

Length of adult female 0.70 mm., of male 0.73 mm.

*Remarks.*—The present species was described as early as the year 1850 by Baird as *Cythere pellucida*, and has been recorded under this name by most subsequent authors. In the year 1889, however, Brady and Norman proposed to change the specific name to *confusa*, because they had found that some specimens in Norman's collection, determined by Baird as *C. pellucida*,

were more properly referable to the form described below as *Leptocythere castanea*. I think however that Baird had confounded these 2 nearly allied species, and that in reality the specimen originally described by him has belonged to the present species, the figure given of it in his work on the British Entomostraca agreeing much better with this than with the other species.

*Occurrence*.—I have taken this species in several places on the Norwegian coast, from the Christiania Fjord to Finmark. It is not strictly a littoral form, being only found at some depth, in the laminarian zone.

*Distribution*.—British Isles, Holland, Bay of Biscay, Mediterranean.

*Fossil*.—Norway, Scotland.

## 77. *Leptocythere, Macallana* (Brady & Roberts.).

(Pl. LXXIX, fig. 2.)

*Cythere Macallana*, Brady & Robertson, Ann. Mag. Nat. Hist., ser. IV, Vol. III, p. 368, Pl. XIX, figs 5—9.

*Specific Characters*.—*Female*. Shell, seen laterally, somewhat irregularly oblong subreniform in shape, higher in front than behind, greatest height nearly equal to half the length, dorsal margin well arched in front and sloping obliquely behind, ventral margin distinctly sinuated in front of the middle and gently curved behind, anterior extremity broadly rounded, posterior obtusely truncated, with the upper corner slightly projecting;—seen dorsally, narrow ovate in outline, with the greatest width behind and about equal to  $\frac{1}{3}$  of the length, anterior extremity more pointed than the posterior. Valves rather thin and pellucid, with the surface smooth and only indistinctly pitted, but marked with distant very small tubercles, anterior and posterior edges finely hairy. Anterior antennæ rather robust, with the first 2 joints of the terminal part comparatively broader than in the preceding species, last joint scarcely longer than the middle one.

*Male*.—Shell somewhat more elongated than in female and more tapered behind, with the dorsal margin more evenly arched and the upper-posteal corner more projecting. Copulative appendages differing conspicuously from those of the preceding species in the shape of the terminal part, the anterior lappet of which is much shorter and obtusely rounded at the end, whereas the posterior lappet is more produced and pointed.

Colour light yellowish, with a slight brownish tinge.

Length of adult female 0.50 m., of male about the same.

*Remarks*.—This is a rather small species, and might, on a cursory view, easily be taken for young of the preceding one. It is however a well defined



species, differing conspicuously in the shape and sculpturing of the shell, as also in the structure of the copulative appendages of the male.

*Occurrence.*—I have only had an opportunity of examining very few specimens of this form, taken, several years ago, in the laminarian region at Risør. Norman has recorded it also from Dröbak and from Lervik, Hardanger Fjord.

*Distribution.*—British Isles, Holland, Mediterranean.

*Fossil.*—Scotland.

### 78. *Leptocythere castanea*, G. O. Sars.

(Pl. LXXX, fig. 1.)

*Cythere castanea*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 32.

Syn: *Cythere propinqua*, G. O. Sars.

• — *pellucida*, Brady & Norman (non Baird).

*Specific Characters.*—*Female.* Shell, seen laterally, oval quadrangular in shape, a little higher in front than behind, greatest height about equalling half the length, dorsal margin only slightly arched, ventral distinctly sinuated in front of the middle and gently curved behind, anterior extremity broadly rounded, posterior obtusely truncated, with the upper corner well marked, lower obsolete; —seen dorsally, oblong ovate in outline, greatest width behind the middle and exceeding somewhat  $\frac{1}{3}$  of the length, anterior extremity more pointed than the posterior. Valves of rather firm consistency and very little pellucid, the surface being marked with closely set very sharply defined rounded pits, extremities clothed with fine hairs. Anterior antennæ robust, resembling in shape those in *L. macallana*; last joint however more produced, exceeding considerably the preceding one in length.

*Male.*—Shell narrower and more compressed than in female, more tapered behind, with the upper-posteal corner rather projecting. Copulative appendages with both lappets of the terminal part greatly produced and exerted in very slender sharp points.

Colour of shell dark reddish brown, limbs bright yellow.

Length of adult female 0.69 mm., of male about the same.

*Remarks.*—This species, though nearly allied to the 2 preceding ones, is easily recognised by the comparatively shorter and stouter shape of the shell, and by the very strongly marked pittings of its surface, as also by the much darker colour. As mentioned above, Brady and Norman wrongly identified it with *Cythere pellucida* of Baird. Indeed, the name *pellucida* would be extremely inappropriate to the present species, which in reality is just distinguished by the

very little transparent opaque shell. The form recorded by me in 1869 under the name of *Cythere propinqua* is identical with the present species, and not, as believed by Brady and Norman, with *L. macallana*.

*Occurrence*.—I have taken this form occasionally in the upper part of the Christiania Fjord, more frequently at Svelvik, entrance of the Drammen Fjord. In the latter locality it occurred near the beach in slightly brackish water, and its occurrence under similar conditions has also been stated by other authors.

*Distribution*.—British Isles, Holland.

*Fossil*.—Scotland.

### 79. *Leptocythere tenera* (Brady).

(Pl. LXXX, fig. 2.)

*Cythere tenera*, Brady, Monogr. Brit. Ostracoda, p. 399, Pl. XXVIII, figs. 29—32.

*Specific Characters*.—*Female*. Shell seen laterally, of a very narrow and elongate shape, a little higher in front than behind, greatest height not nearly attaining half the length, dorsal margin slightly arched in front and sloping gently behind, ventral margin distinctly sinuated in the middle and curving evenly upwards behind, anterior extremity well rounded off, posterior narrowly obtuse, with the upper corner scarcely projecting;—seen dorsally, narrow oblong in outline, with the greatest width rather less than  $\frac{1}{3}$  of the length, both extremities obtusely pointed. Valves very thin and pellucid, almost destitute of pittings and only marked with a few small tubercles, edges minutely hairy.

*Male*.—Shell only slightly differing in shape from that in the female. Copulative appendages with the lappets of the terminal part but slightly produced, the posterior obtuse at the tip, the anterior pointed.

Colour whitish pellucid.

Length of adult female 0.45 mm.

*Remarks*.—This species may be easily distinguished from the 3 preceding ones by the narrow and elongated shape of the shell, and by the very thin and transparent valves. It is also of rather smaller size than any of them.

*Occurrence*.—A single female specimen of this form, that figured on the accompanying plate, was taken, some years ago, at Risør, South coast of Norway, in a depth of about 20 fathoms. Norman has recorded it also from Dröbak and from Lervik, Hardanger Fjord. Among some specimens kindly forwarded to me by that author, mounted dry, I found a single male, and by moistening this specimen, I succeeded in extracting from the shell the copulative appendages in a condition perfect enough to admit a closer examination.

As seen from the figure given, they differ conspicuously from those of the other species in the shape of the terminal part.

*Distribution*.—British Isles, Holland, Bay of Biscay.

*Fossil*.—Scotland.

#### 80. *Leptocythere crispata* (Brady).

(Pl. LXXX, fig. 3.)

*Cythere crispata*, Brady, Ann. Mag. Nat. Hist., ser. IV, Vol. II, p. 221, Pl. XIV, figs. 14—15.

Syn: *Cythere cicatricosa*, G. O. Sars (not Reuss).

" — *badia*, Brady (not Norman).

*Specific Characters*.—*Female*. Shell, seen laterally, oval subreniform in shape, higher in front than behind, greatest height exceeding somewhat half the length, dorsal margin gibbously arched in the ocular region and sloping gently behind, ventral margin slightly sinuated in the middle, anterior extremity broadly rounded, posterior much narrower and obtusely truncated, with the upper corner but little projecting;—seen dorsally, narrow oblong in outline, with the greatest width behind and rather less than  $\frac{1}{3}$  of the length, side-margins irregularly flexuous, both extremities obtuse at the tip; the anterior narrower than the posterior. Valves of rather firm consistency, with the surface very uneven, exhibiting irregular depressions or grooves defined by more or less distinct elevated ridges. Anterior antennæ with the terminal part somewhat longer than the distal segment of the basal one; spine of the proximal joint much reduced, last joint shorter than the middle one. Legs less rapidly increasing in length posteriorly than in the other species.

Colour of shell light chestnut brown.

Length of adult female 0.40 mm.

*Remarks*.—This small Ostracod was described by the present author in the year 1865 under the name of *Cythere cicatricosa*. As however this name had been preoccupied by Reuss for a different species, the specific name was replaced by Brady in the year 1868 with that of *crispata*. The said author had previously identified this form with *Cythere badia* of Norman, which however is specifically different, though nearly allied. Some of the species of *Cythere* described by G. W. Müller from the Gulf of Naples look very like the present form, and it is not improbable that one or other of them might turn out to be identical with the northern species.

*Occurrence*.—I have taken this form occasionally in the upper part of Christiania Fjord, as also in some other places on our southern and western

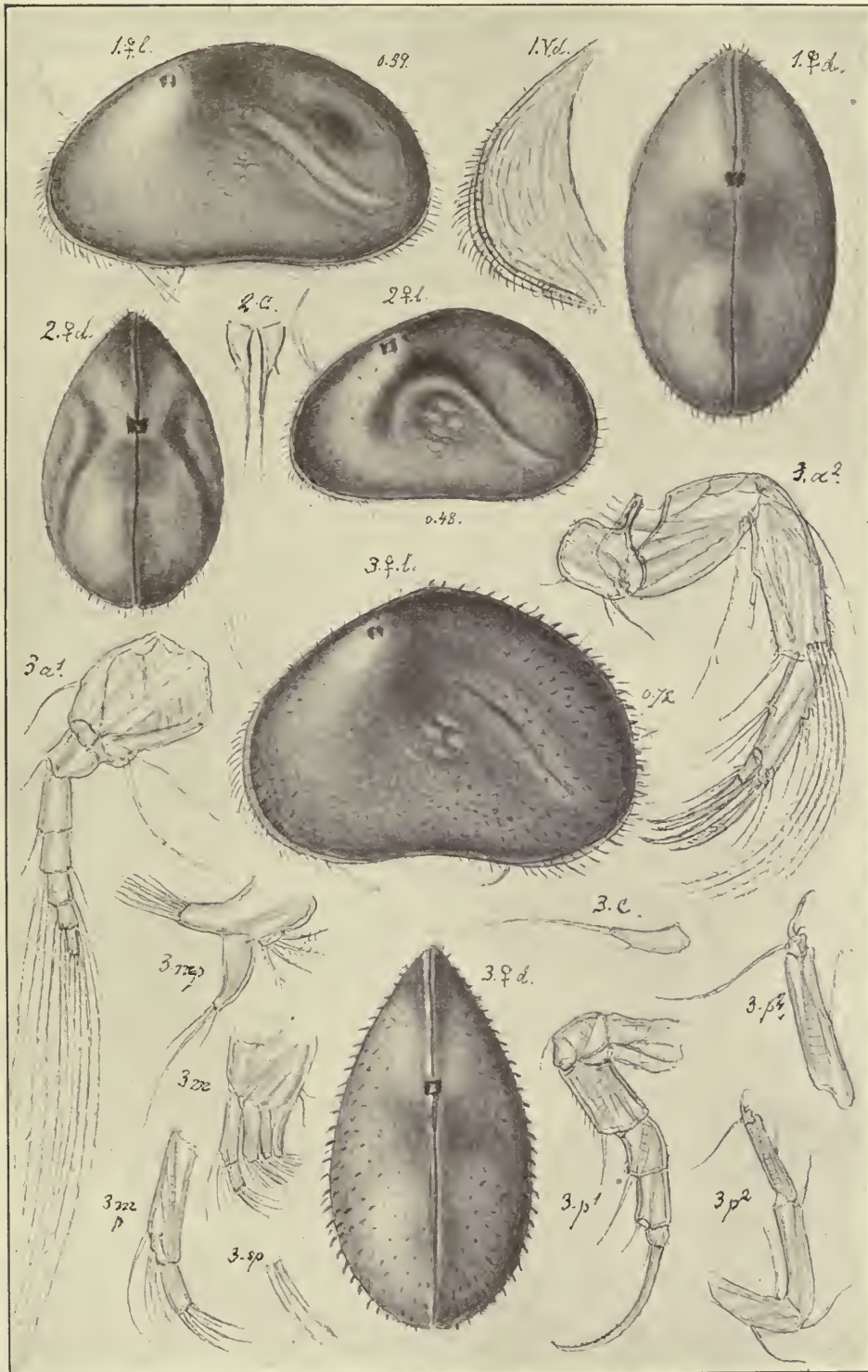


# Ostracoda

Cypridæ

Podocopa

Pl. LXV



G. O. Sars del.

1. *Pionocypris Almi*, G. O. Sars
2. " *picta* (Strauss)
3. *Cypridopsis aculeata* (Costa)

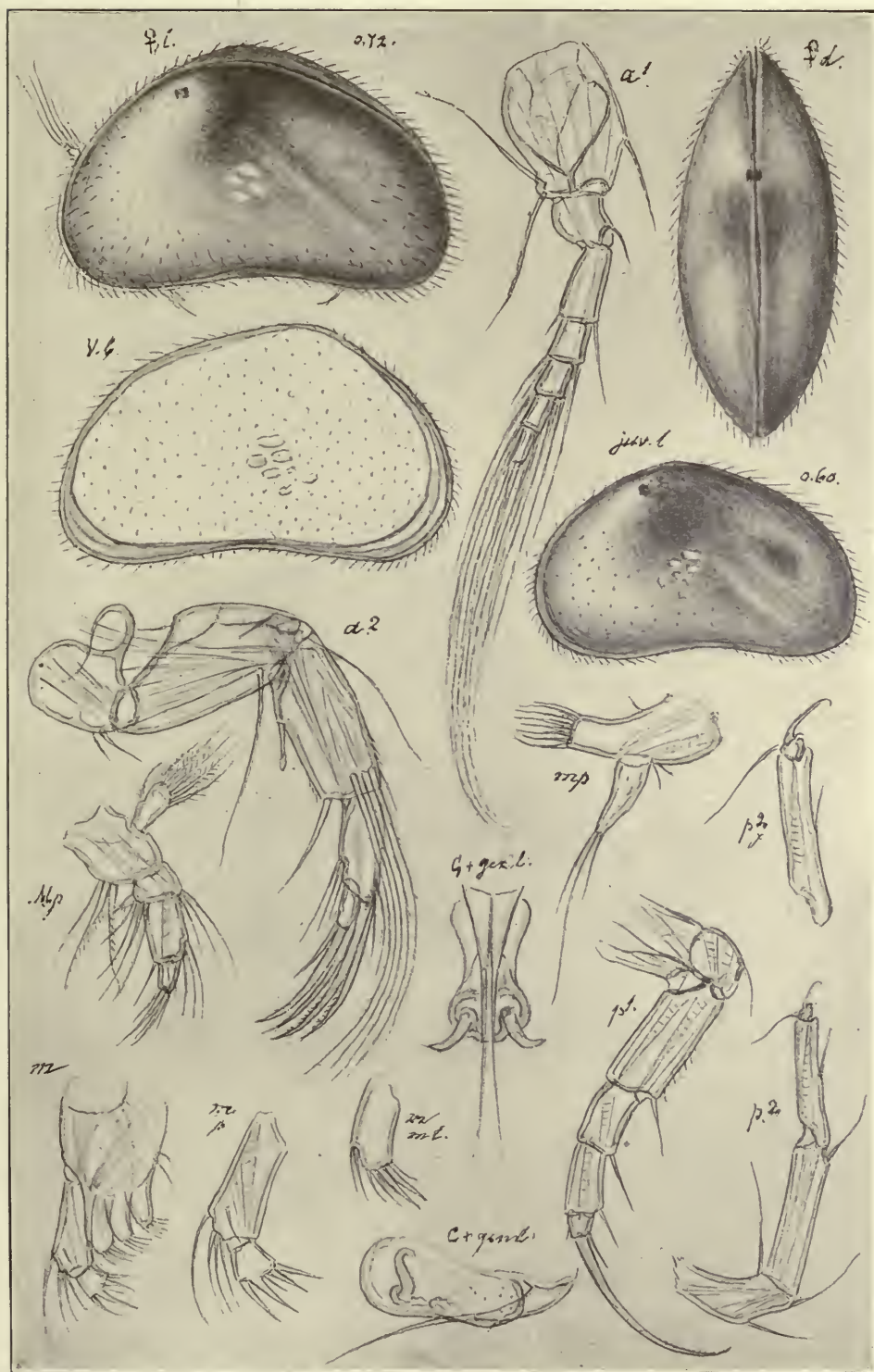


# Ostracoda

Cypridæ

## Podocopa

Pl. LXVI



G. O. Sars del.

*Cypridopsella villosa* (Jurine)



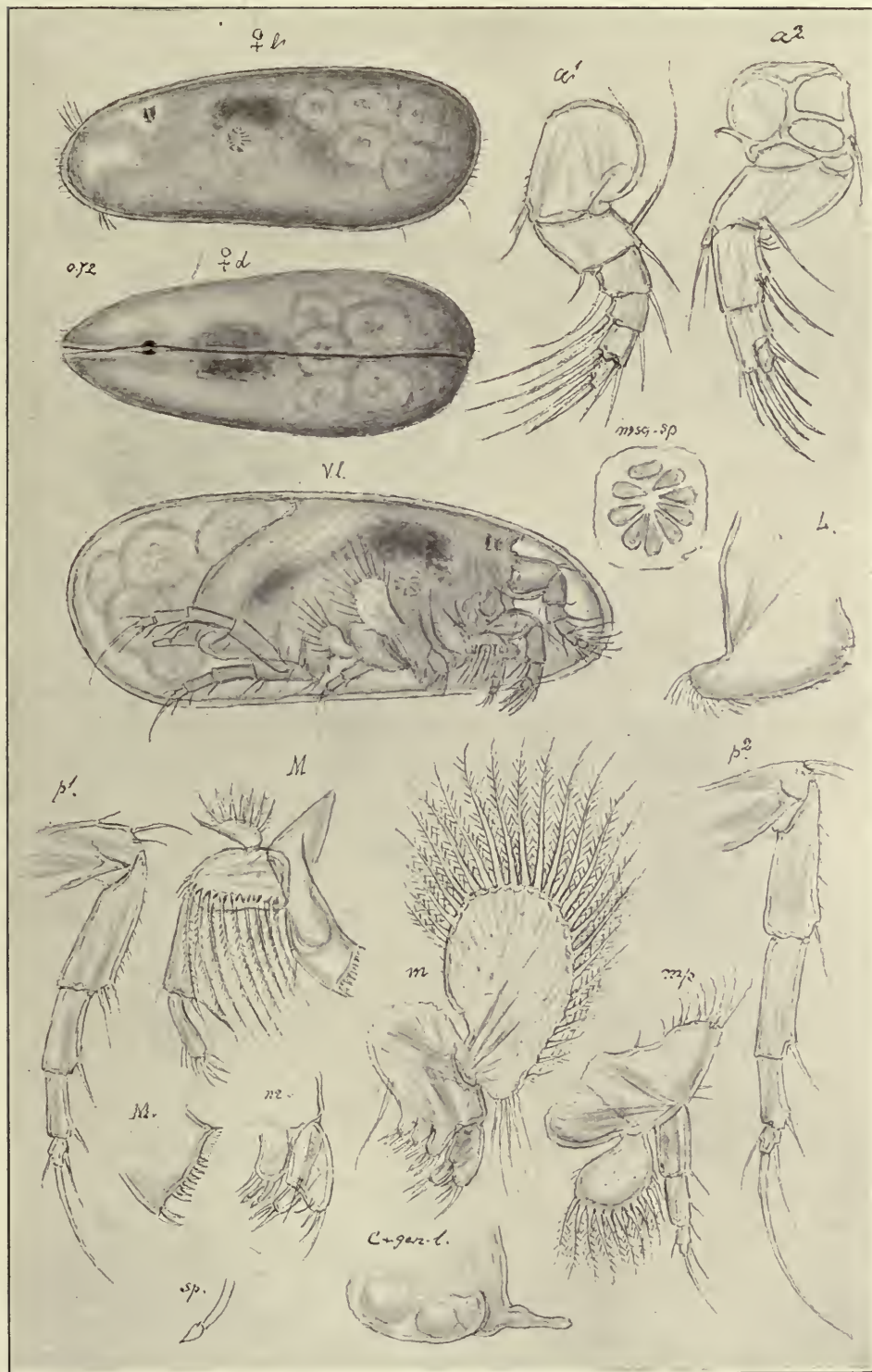


# Ostracoda

Cypridæ

Podocopa

Pl. LXVII



G. O. Sars del.

*Darwinula Stevensoni* (Br. & Rob.)



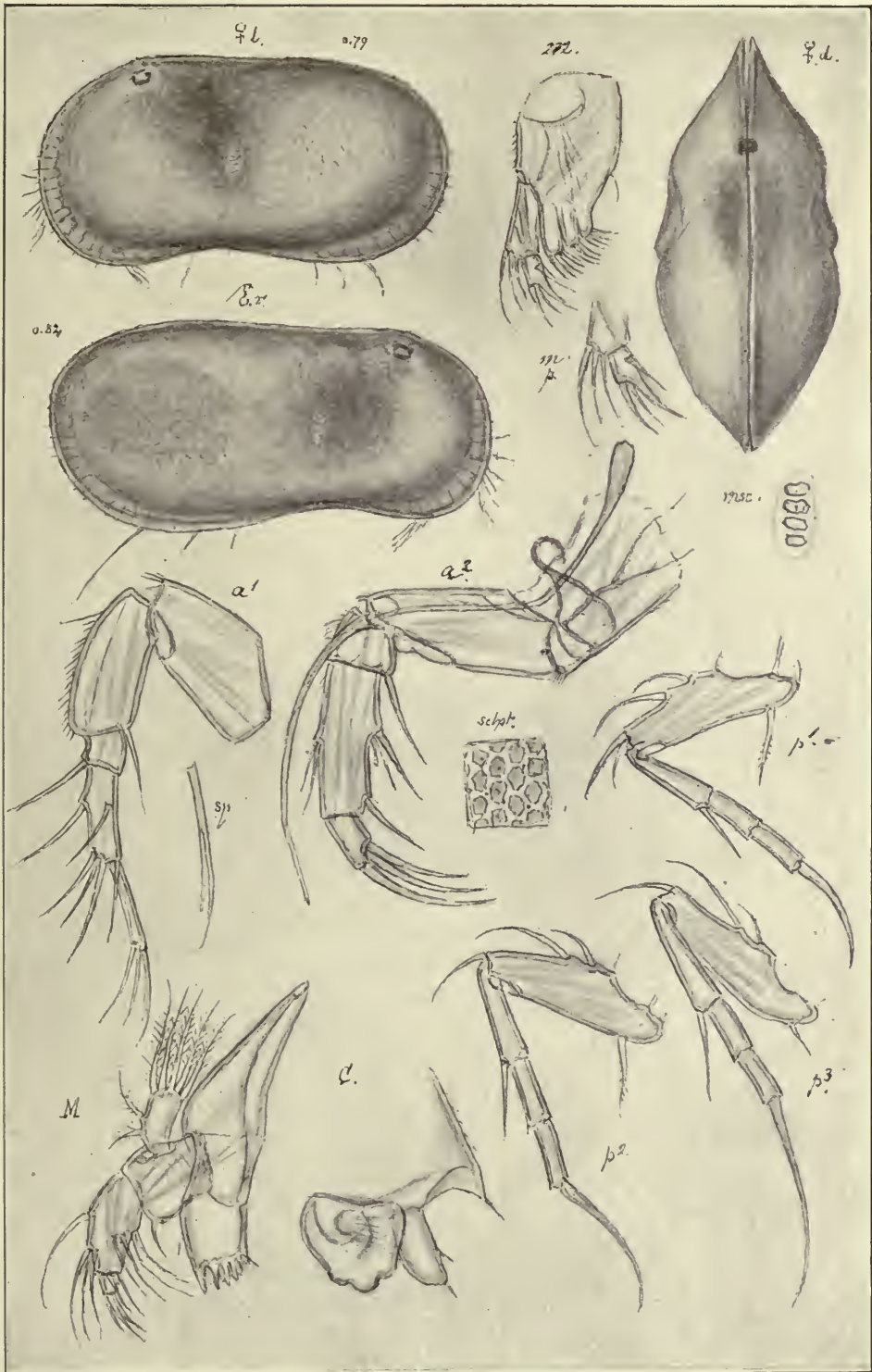


# Ostracoda

Cytheridæ

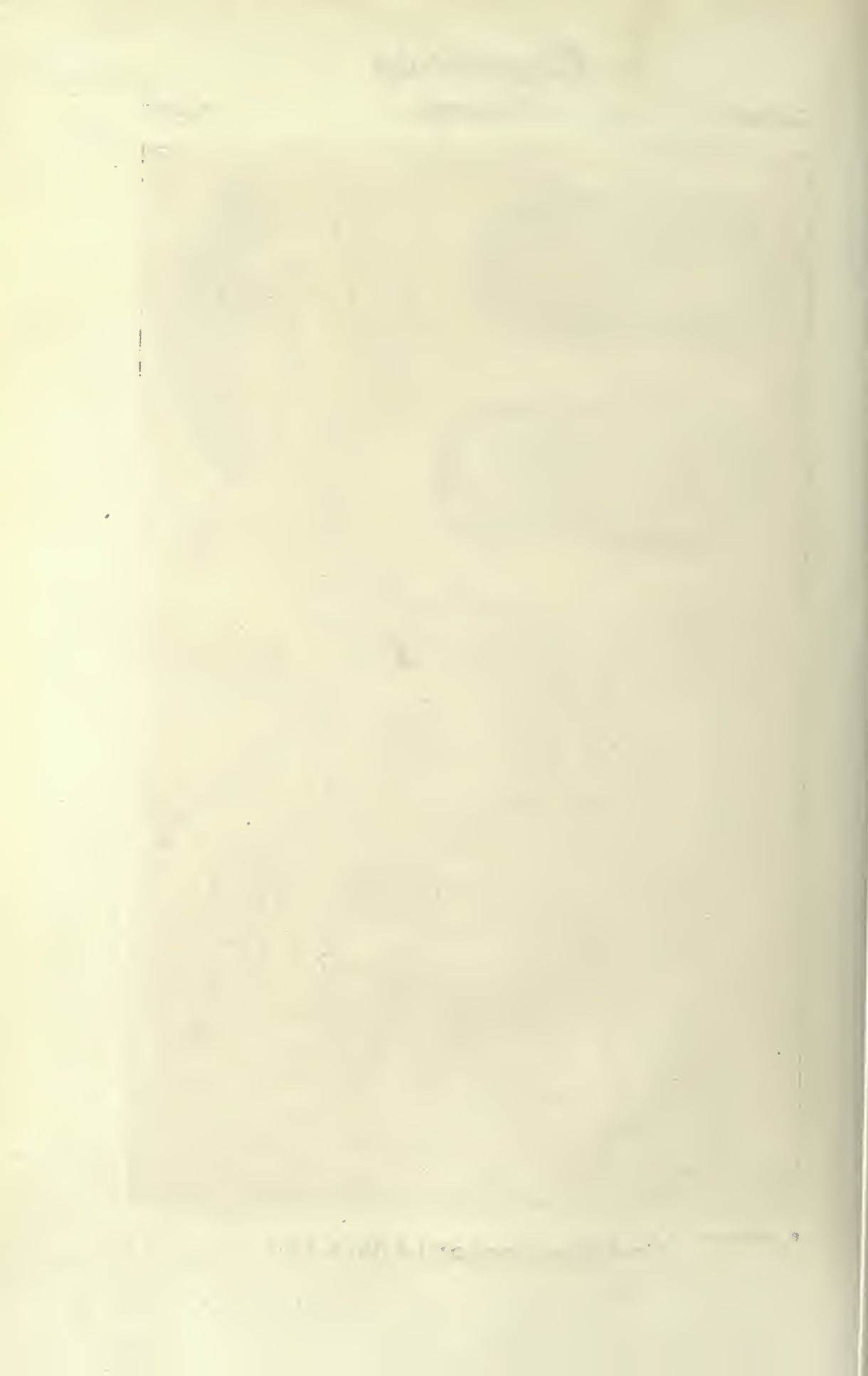
Podocopa

Pl. LXVIII



G. O. Sars del.

*Limnocythere sancti-patricii* (Br. & Rob.)

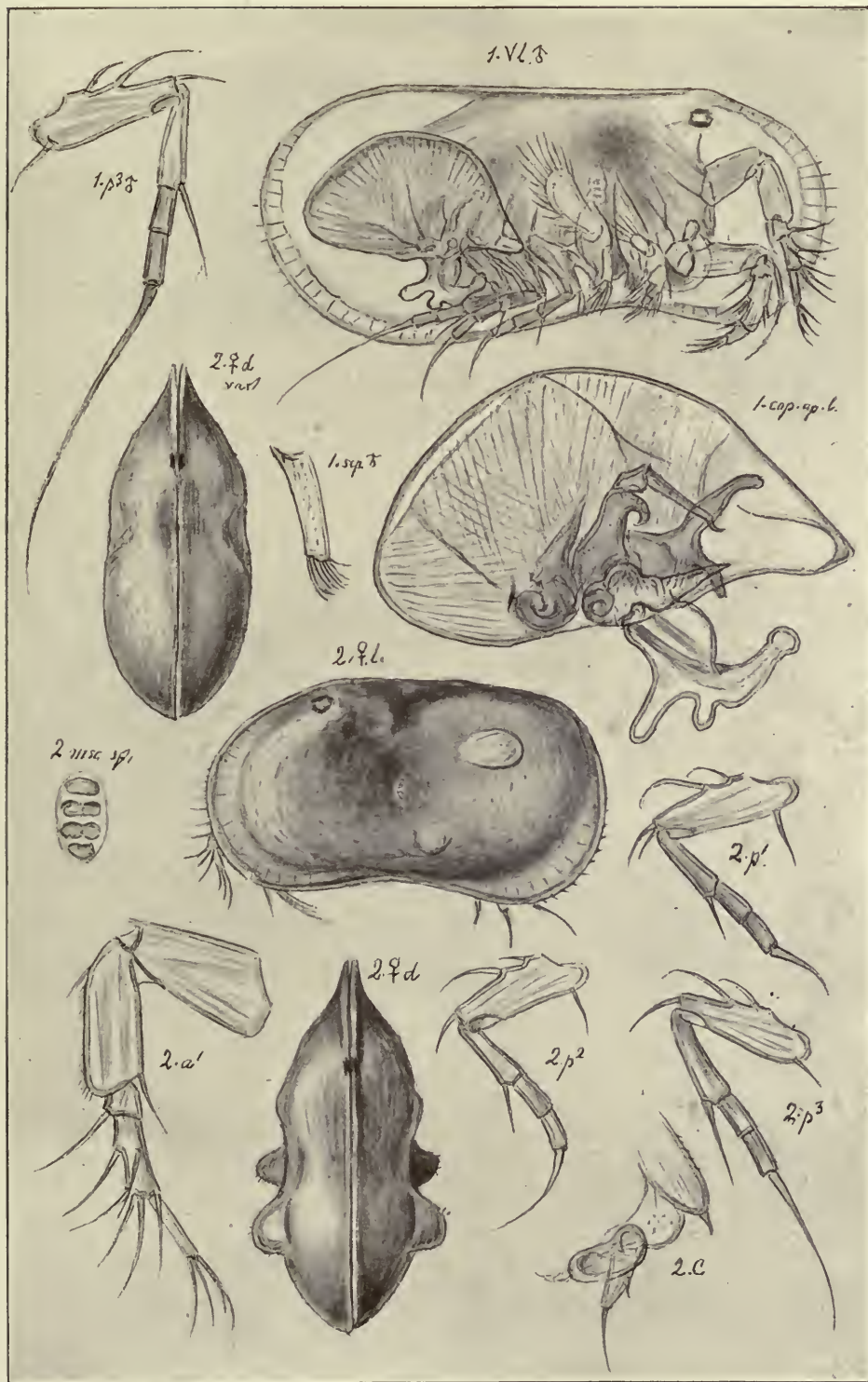


# Ostracoda

Cytheridæ

## Podocopa

Pl. LXIX



G. O. Sars del.

1. *Limnocythere sancti-patricii* (male)
2. „ *inopinata* (Baird)



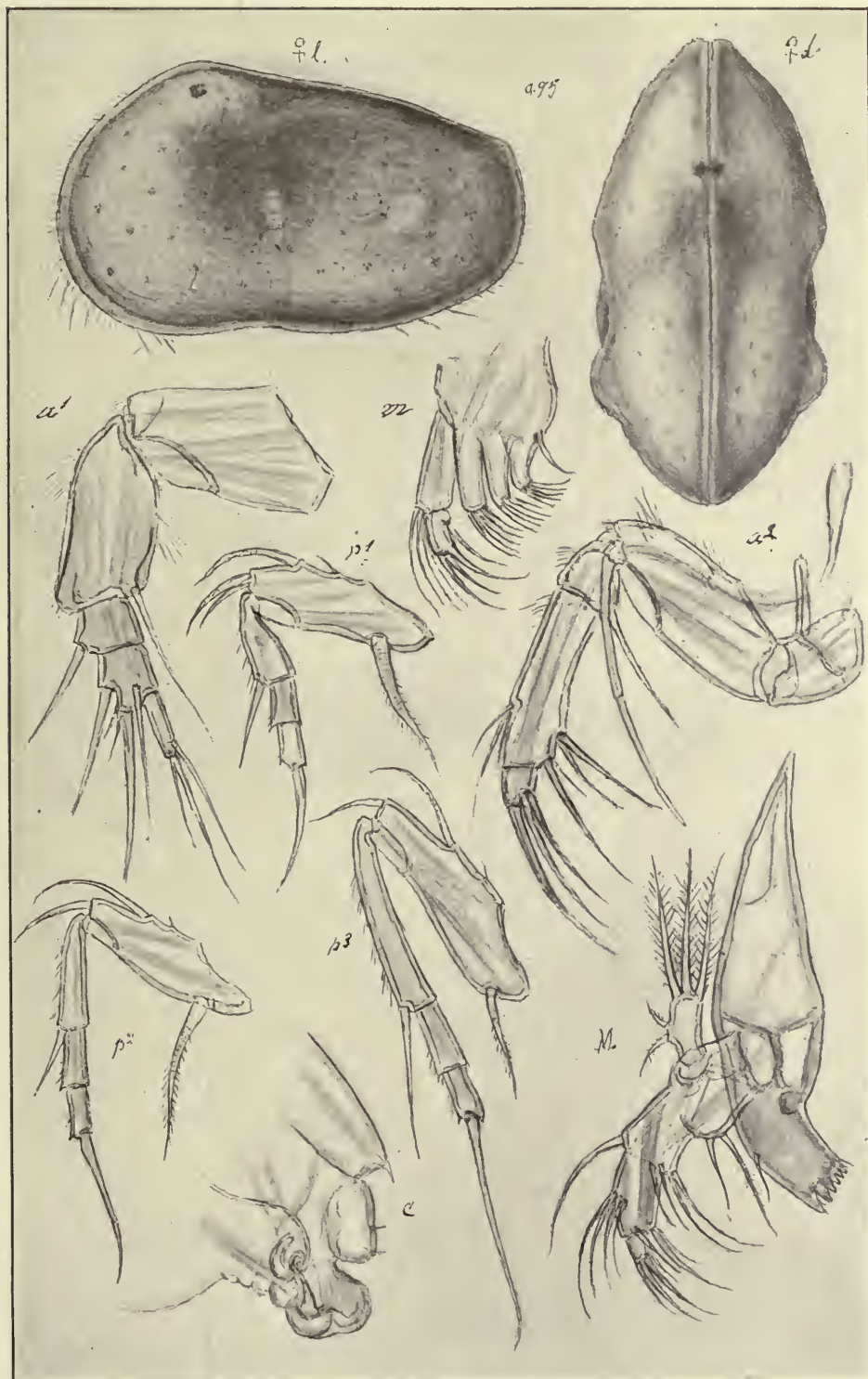


# Ostracoda

Cytheridæ

Podocopa

Pl. LXX



G. O. Sars del.

*Cytherissa lacustris*, G. O. Sars



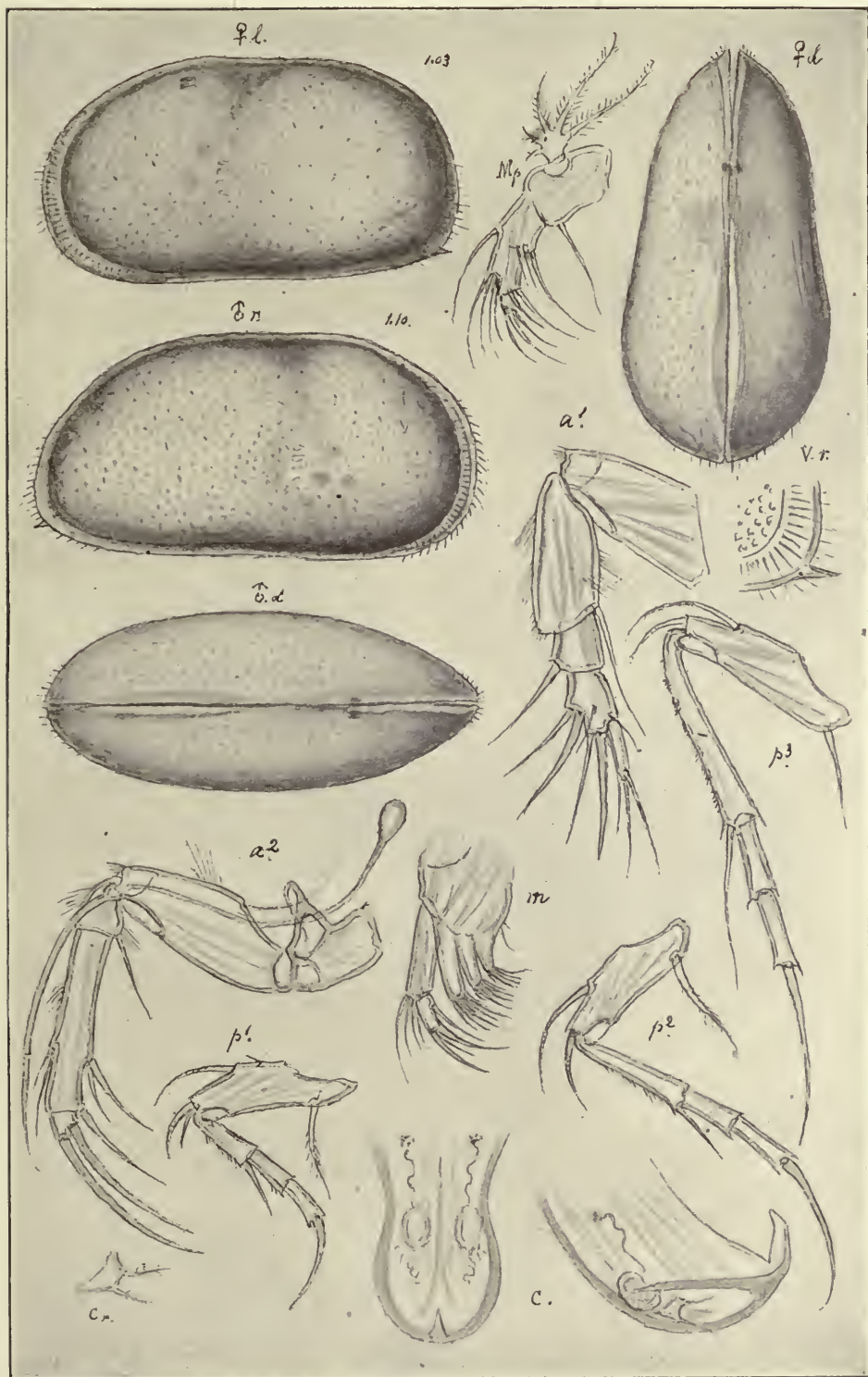


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXI



G. O. Sars del.

*Cyprideis littoralis* (Brady)

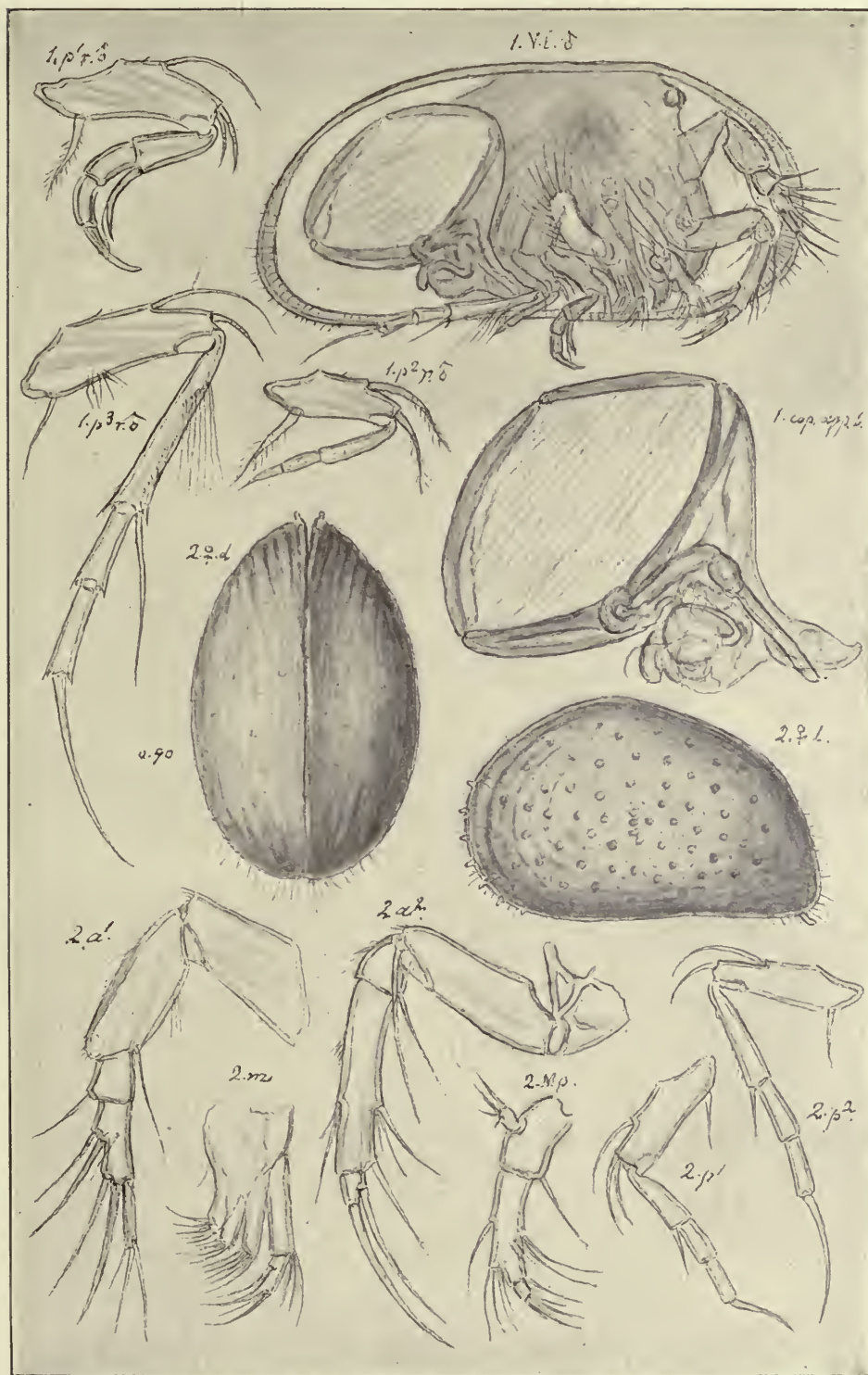


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXII



G. O. Sars del.

1. *Cyprideis littoralis* (Brady), male
2.     "     *sorbyana* (Jones)



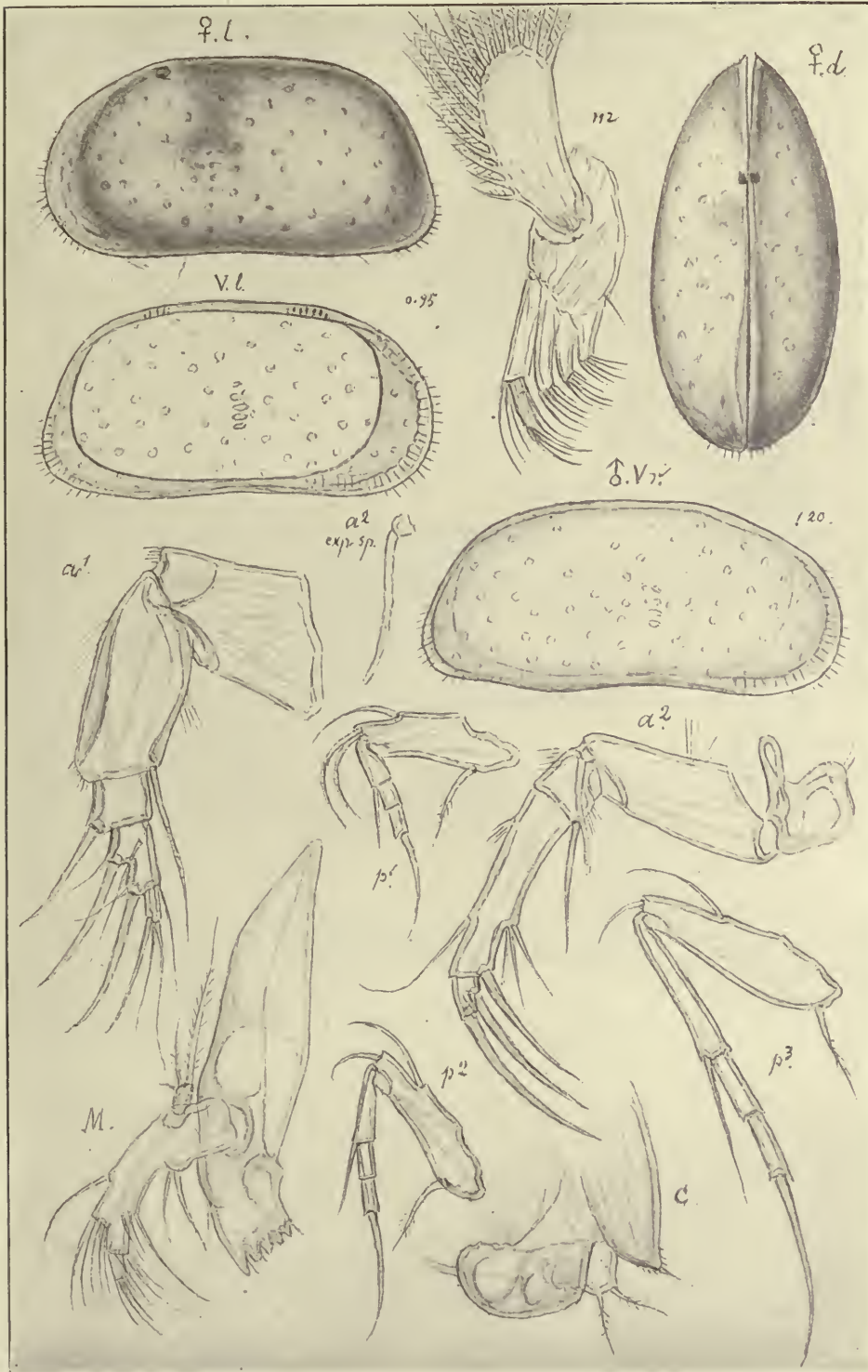


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXIII



G. O. Sars del.

*Cytheridea papillosa*, Bosquet



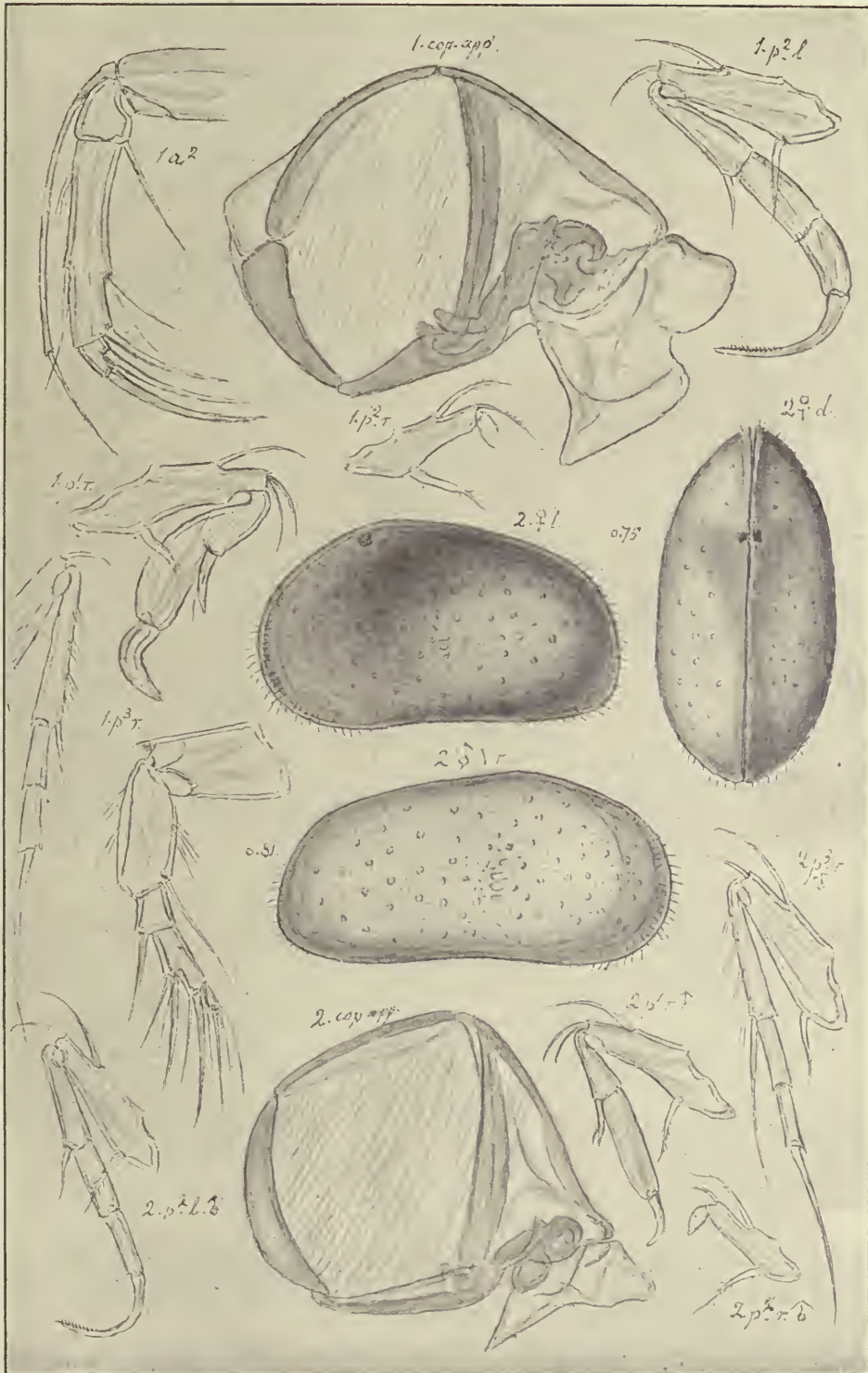


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXIV



G. O. Sars del.

1. *Cytheridea papillosa* (Bosquet), male
2.     "     *punctillata*, Brady

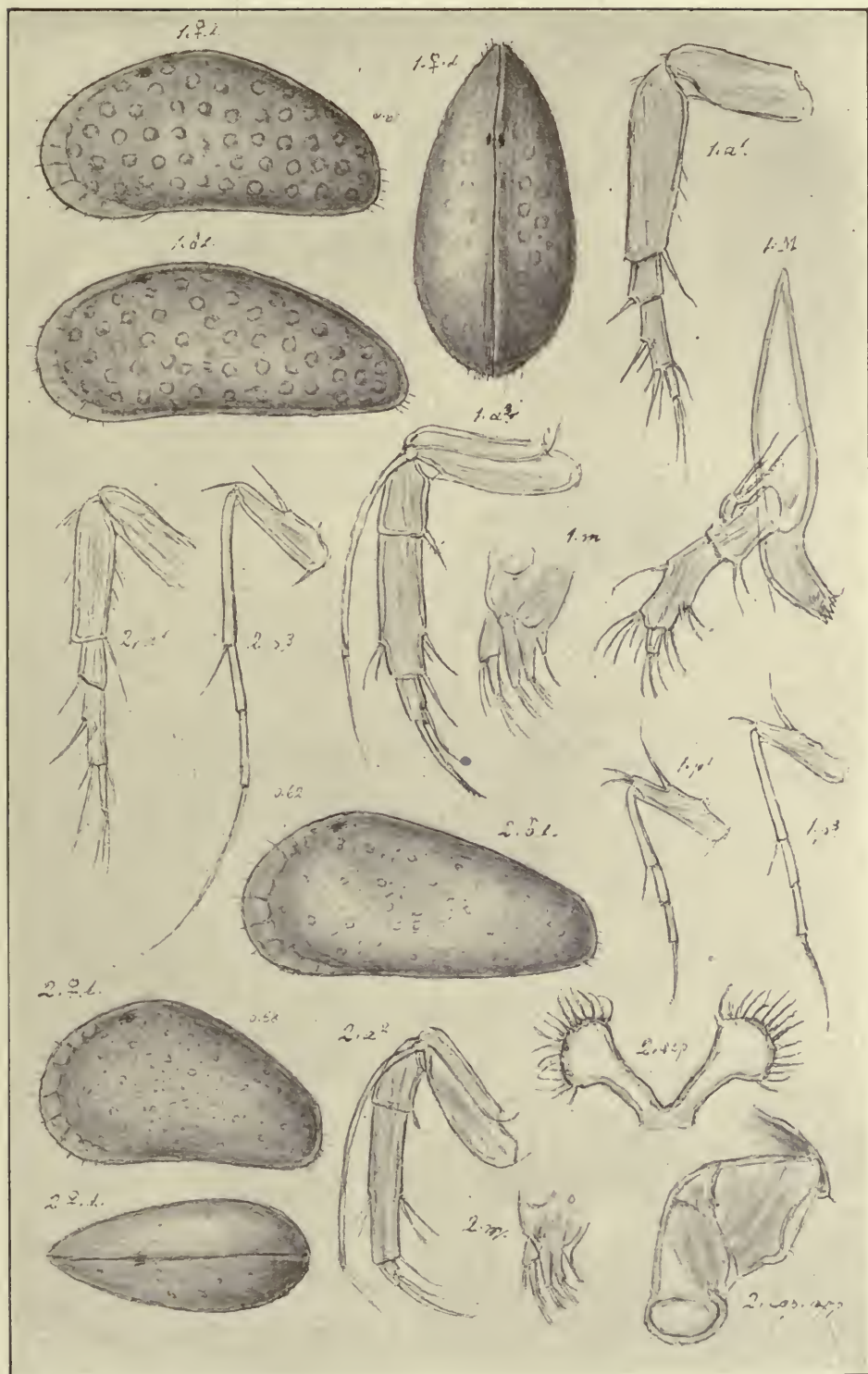


# Ostracoda

Cytheridæ

## Podocopa

Pl. LXXV



G. O. Sars del,

1. *Eucythere argus*, G. O. Sars
2. „ *declivis* (Norman)



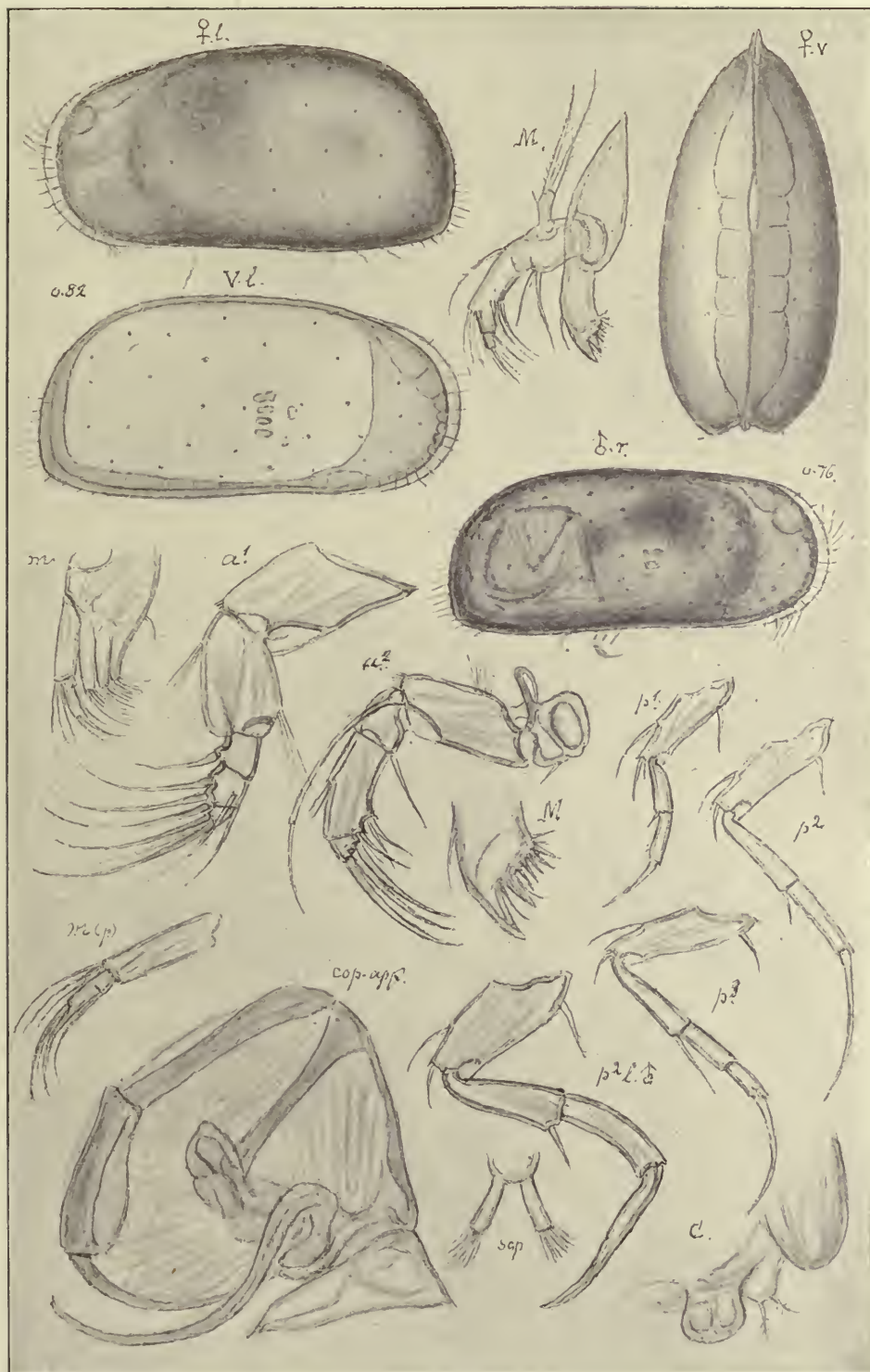


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXVI



G. O. Sars del.

*Krithe bartonensis* (Jones)





# Ostracoda

Cytheridæ

Podocopa

Pl. LXXVII



G. O. Sars del.

*Cythere lutea*, O. Fr. Müller

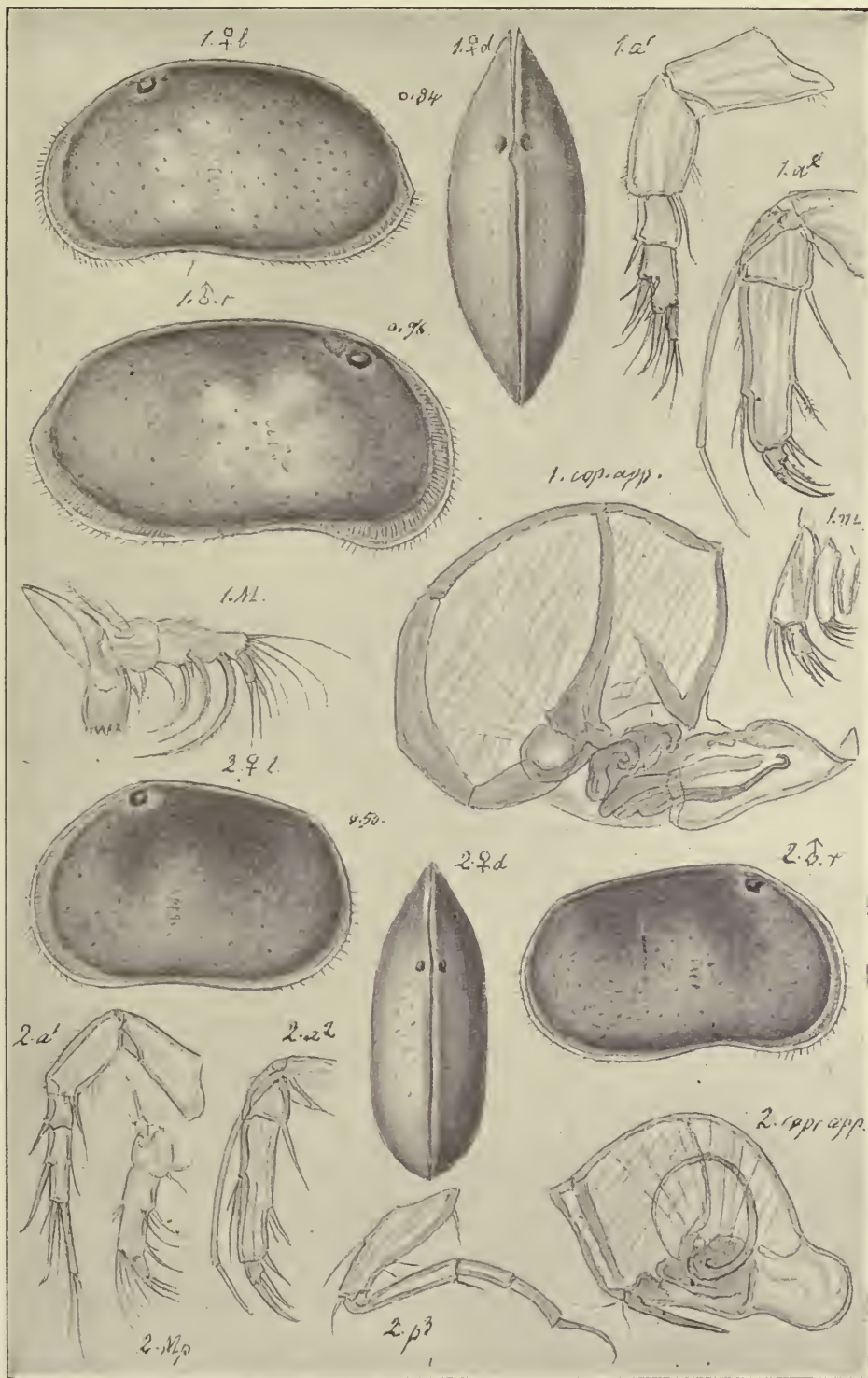


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXVIII



G. O. Sars del.

1. *Cythere albomaculata*, Baird
2. „ *viridis*, O. Fr. Müller



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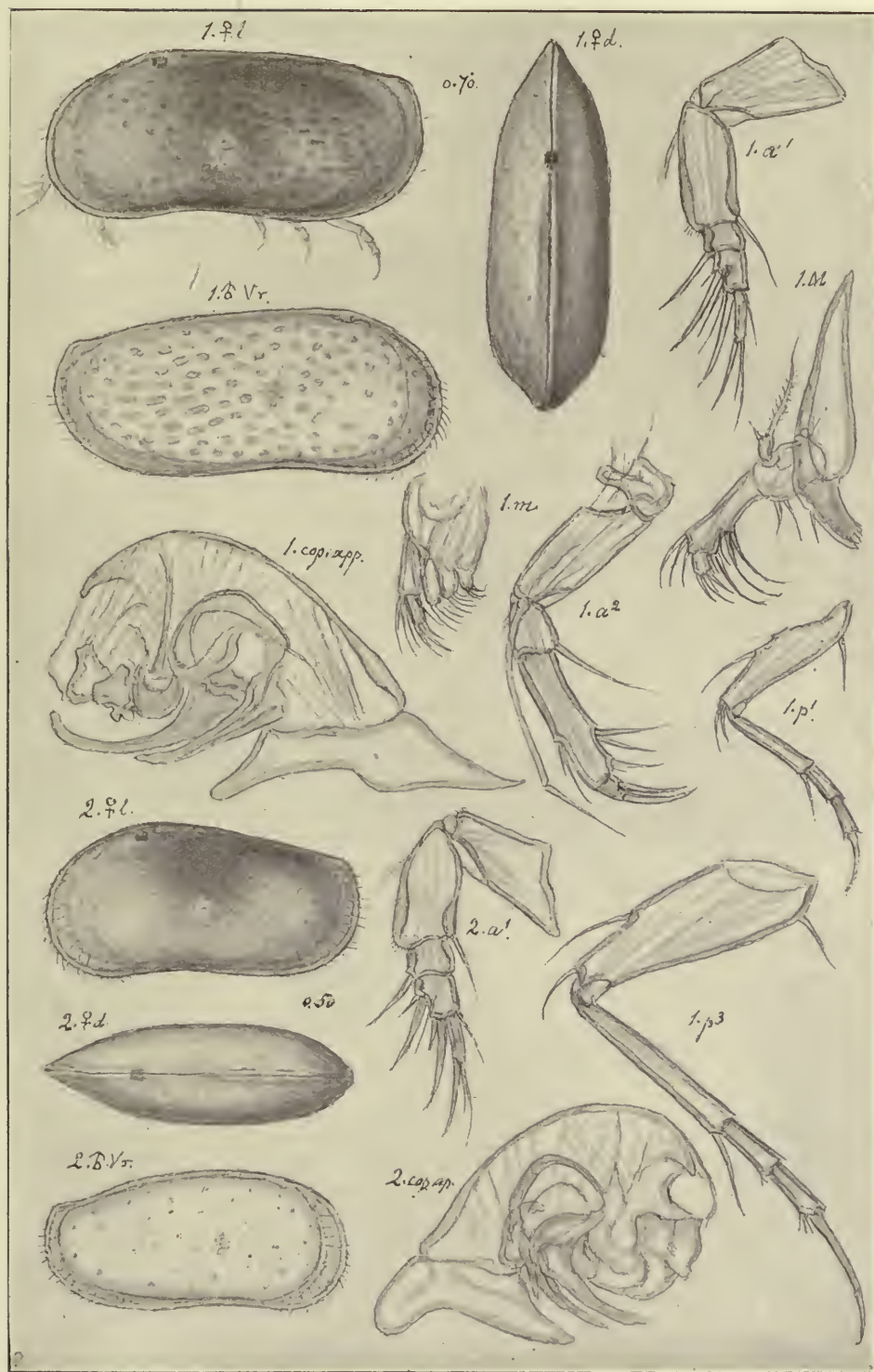
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# Ostracoda

Cytheridæ

Podocopa

Pl. LXXIX



G. O. Sars del.

1. *Leptocythere pellucida* (Baird)
2.       "       *Macallana* (Brady & Rob.)



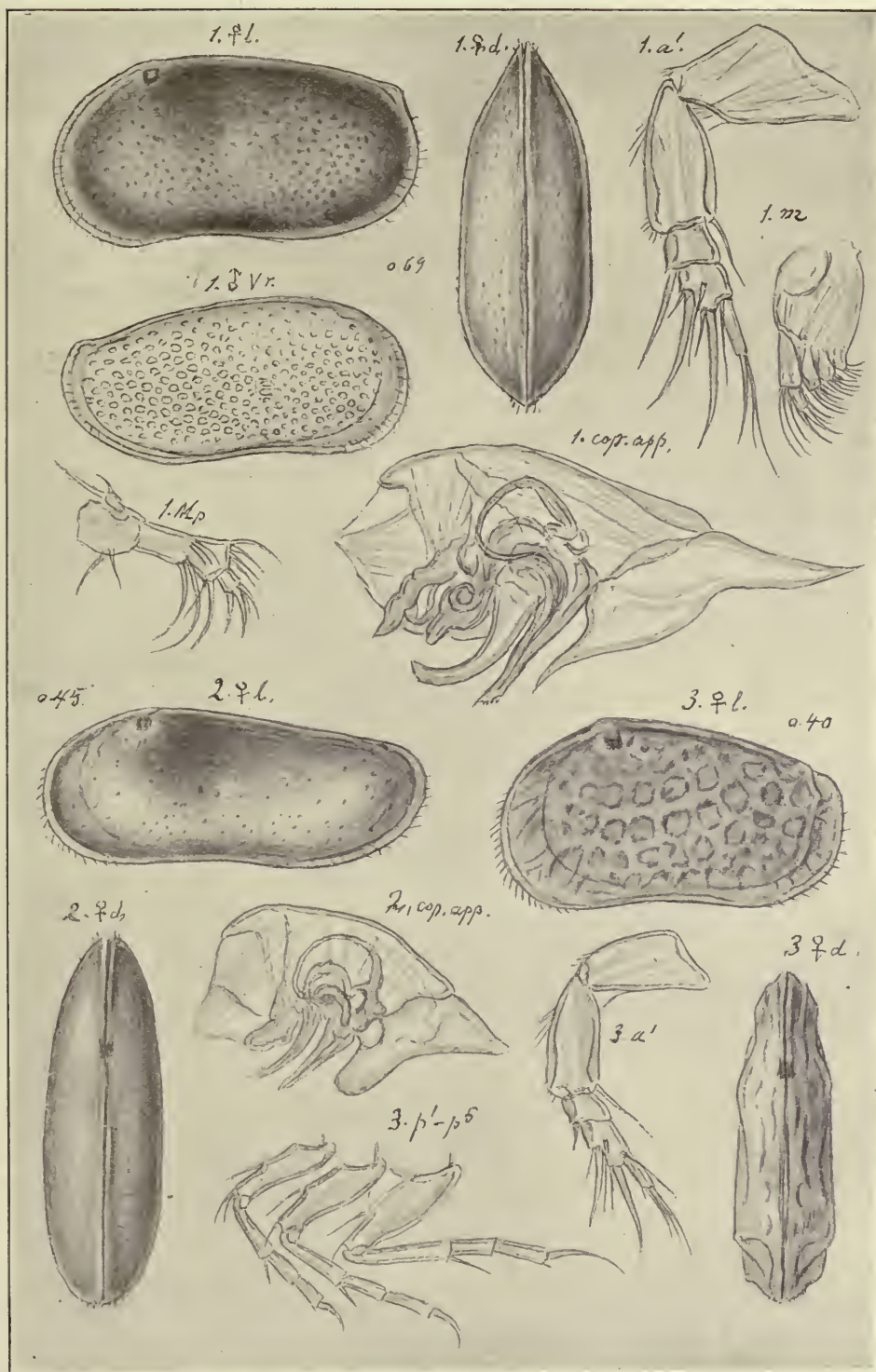


# Ostracoda

Cytheridæ

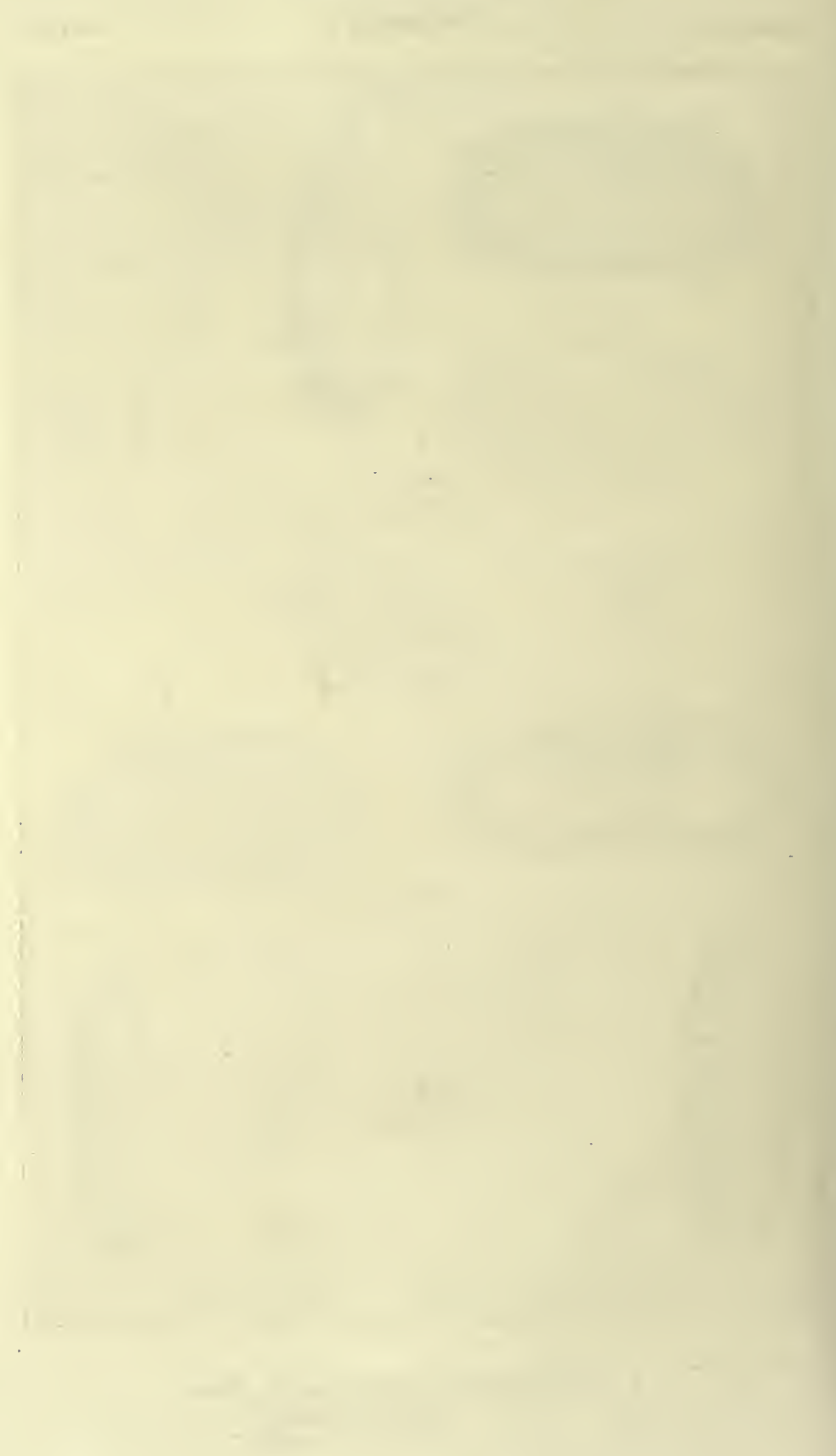
Podocopa

Pl. LXXX



G. O. Sars del.

1. *Leptocythere castanea*, G. O. Sars
2. " *tenera* (Brady)
3. " *crispata* (Brady)



coast. It is found in the laminarian region at a depth of a few fathoms, but may easily escape to attention by its small size.

*Distribution*.—British Isles, ? Mediterranean.

*Fossil*.—Scotland.

### Gen. 37. *Cytheromorpha*, Hirschmann, 1901.

*Generic Characters*.—Shell short and stout, of very firm consistency, with the surface conspicuously pitted. Hinge well developed. Eyes distinctly separated. Anterior antennæ with the terminal part 4-articulate, and armed in front with 4 strong spines, last joint prolonged, with one of the apical setæ spiniform. Posterior antennæ with 2 claw-like spines inside the penultimate joint, apical claws very slender; flagellum of same appearance in the 2 sexes. Mandibular palp with the terminal joint very small, vibratory plate rather fully developed. Maxillæ with the masticatory lobes not much prolonged, palp with the distal joint comparatively short. Legs rapidly increasing in length posteriorly, basal part with 2 unequal setæ on the anterior border. Caudal lamellæ edged at the tip with 2 bristles. Copulative appendages of male very large, but with the terminal part imperfectly developed.

*Remarks*.—This genus was established in the year 1901 by Hirschmann, to comprise 2 Cytherids found by him in the Gulf of Finland, one of them being subsequently identified with a *Cythere* long ago described by Brady. The genus, which is admitted by Dr. Alm, is nearly allied to *Cythere*, in the restriction here adopted, but differs decidedly in the structure of the anterior antennæ, and in the much fuller development of the vibratory plate on the mandibular palp. In addition to the 2 species observed by Hirschmann, the *Cythere rubida* Brady is very probably referable to this genus, and perhaps also some other species described by that author solely from the shell. Only the type species is represented in the Fauna of Norway.

#### 81. *Cytheromorpha fuscata*, (Brady).

(Pl. LXXXI).

*Cythere fuscata*, Brady, Ann. Mag. Nat. Hist. Ser. IV, Vol. III, p. 47, Pl. VII, figs. 5—8.

Syn: *Cythere drammensis*, G. O. Sars.

„ *Cytheromorpha albula*, Hirschmann.

*Specific Characters*.—*Female*. Shell, seen laterally, short oval or somewhat subtriangular in shape, much higher in front than behind, greatest height nearly attaining  $\frac{3}{5}$  of the length, dorsal margin gibbously arched in the ocular



region and sloping rather steeply behind, ventral margin almost straight, anterior extremity broadly rounded, posterior much narrower and obtusely truncated, with the upper corner well marked, the lower rounded off;—seen dorsally, oblong ovate in outline, with the greatest width behind the middle and about equal to  $\frac{2}{5}$  of the length, anterior extremity pointed, posterior obtuse.—Valves only slightly transparent, with a slight angular expansion behind, near the ventral face; surface of a dull appearance, being marked with closely set somewhat polygonal pits and a few small tubercles; marginal zone well defined and crossed by somewhat distant pore-channels; edges clothed with scattered hairs. Anterior antennæ with the terminal part much longer than the distal segment of the basal part, last joint very narrow and nearly as long as the 2 preceding joints combined. Vibratory plate of mandibular palp edged with 4 setæ of unequal length. Last pair of legs with the terminal part more than twice as long as that of 1st pair. Genital lobes comparatively large, reniform in shape.

*Male*.—Shell considerably more elongate than in female, seen laterally, oblong subreniform in shape, with the greatest height scarcely attaining half the length, ventral margin distinctly sinuated in front of the middle, anterior extremity somewhat deflexed. Copulative appendages with the basal part very voluminous, oval trigonal in shape, and sending off below 2 blunt processes curving forwards; terminal part very small and imperfectly defined from the basal one, terminating in front in a short pointed lappet.

Colour of shell grayish or pale fuscous.

Length of adult female 0.58 mm., of male 0.70 mm.

*Remarks*.—This form was recorded as early as the year 1868 by Brady, and was described the following year by the present author under the name of *Cythere drammensis*. The identity of this latter form with *Cythere fuscata* was however not recognised by Brady, who erroneously referred it to another nearly allied, but evidently different species viz., *Cythere rubida* Brady. The present species ought to be regarded as the type of the genus *Cytheromorpha*.

*Occurrence*.—The only place where I have hitherto met with this form is at Svelvik, entrance of the Drammen Fjord. It occurred here rather abundantly in a short distance from the beach among algæ, together with *Leptocythere castanea* and a number of true fresh-water Entomostraca, the surface-water in the Fjord being almost quite fresh by the afflux of the great Drammen river.

*Distribution*.—Gulf of Finland, Sweden, British Isles, Holland.

*Fossil*.—Scotland.

Gen. 38. *Xenocythere*, G. O. Sars, n.

*Generic Characters*.—Shell cuneate in shape, much higher in front than behind, with the ventral face broad and flattened. Valves subequal, moderately strong, with the inner duplicatures rather broad in front and crossed by scattered pore-channels. Hinge with the edges minutely crenulated in the middle, closing teeth imperfectly developed. Eyes confluent. Antennæ comparatively short and stout, the anterior ones with the terminal part triarticulate and armed in front with 3 clawlike spines, the posterior ones with only a single apical claw accompanied posteriorly by a very small spine. Vibratory plate of mandibular palp comparatively small, with only 3 setæ, the anterior one rudimentary. Maxillæ with the masticatory lobes rather produced, palp comparatively narrow. Legs moderately slender, basal part with only a single seta of the anterior margin. Caudal lamellæ rounded in shape, with 2 comparatively small bristles. Copulative appendages of male large, with the basal part remarkably high, terminal part triangular in shape.

*Remarks*.—This new genus is only founded on a single species, which however exhibits some rather distinct differences from the other genera here recorded, both as to the general shape of the shell and to the structure of some of the appendages.

82 *Xenocythere cuneiformis* (Brady).

(Pl. LXXXII).

*Cythere cuneiformis*, Brady, Monogr. Brit. Ostracoda, p. 404, Pl. XXXI, figs. 47—54.Syn: *Cythere ventricosa*, G. O. Sars (not Speyer).

*Specific Characters*.—*Female*. Shell, seen laterally, oblong sublavate in shape, tapering behind to an obtuse point; greatest height quite in front, and about equal to half the length, dorsal margin gibbously bent in the ocular region and sloping rather steeply behind at a nearly straight course, ventral margin very slightly sinuated, anterior extremity obliquely rounded off, posterior rather narrow and exerted below to an obsusely conical prominence;— seen dorsally, broadly ovate in outline, with the greatest width about half the length, lateral margins slightly concaved in the middle, anterior extremity obtusely pointed, posterior abruptly contracted to a projecting conical prominence. Surface of valves indistinctly pitted, and more or less conspicuously rugose longitudinally, being clothed at each extremity with scattered fine hairs. Anterior antennæ with the last joint about half the length of the penultimate one.

Posterior antennæ with the terminal joint rather small, apical claw moderately slender, lateral spine scarcely exceeding in length  $\frac{1}{3}$  of the claw.

*Male* of smaller size than female, and having the shell rather narrower, with the dorsal margin slightly concaved. Copulative appendages with the basal part oblong quadrangular in shape and narrowly truncated above, terminal part produced in front to a narrow lappet obtuse at the tip.

Colour of shell light yellowish brown.

Length of adult female 0.75 mm., of male 0.64 mm.

*Remarks.*—This form was described as early as the year 1865 by the present author; but as the specific name at that time proposed had been preoccupied by Speyer for another Cytherid, it was subsequently chanced by Brady as above. It is an easily recognisable form, distinguished at once from most other Cytherids by the peculiar shape of the shell.

*Occurrence.*—The present Cytherid is of rather rare occurrence. I have only met with it quite occasionally in some places on the south coast of Norway (Langesund, Risør), at moderate depths. Norman has recorded it also from the Hardanger Fjord, at Lervik.

*Distribution.*—British Isles.

*Fossil.*—Norway, Scotland.

### Gen, 39. **Kyphocythere**, G. O. Sars, n.

*Generic Characters.*—Shell short, ventricose, angular, with the surface partly rugose and provided with scattered nodiform protuberances. Valves subequal, rather thin and fragile, faintly areolate, and everywhere very finely punctate. Hinge with the closing teeth well developed. Eyes wholly absent. Antennæ slender and attenuated, the anterior ones with the terminal part 3-articulate, last joint much produced; the posterior ones with 3 slender apical claws, flagellum well developed in both sexes. Mandibular palp comparatively narrow, with 2 plumose setæ on the vibratory plate. Maxillæ with the masticatory lobes short and stout, palp not very slender, proximal seta of the vibratory plate remarkably thickened at the base and clothed at this place with long deflexed cilia. Legs rather slender, with only a single seta of the anterior border of the basal part. Caudal lamellæ small, bisetose. Copulative appendages of male with the basal part of moderate size, terminal part narrowly produced in front.

*Remarks.*—This is another new genus, which I have found it necessary to establish, in order to include an anomalous species, hitherto referred to the



genus *Cythere*, but in reality differing both from this genus and its allies by several well-marked particularities. The generic name proposed alludes to the peculiar gibbosity of the shell.

### 83. *Kyphocythere limicola* (Norman).

(Pl. LXXXII.)

*Cythere limicola*, Norman, Nat. Hist. Trans. Northumb. & Durham, Vol. I, p. 20.

Pl. VI, figs. 1—4.

Syn: *Cythere nodosa*, G. O. Sars.

" — *areolata*, Brady.

*Specific Characters.*—*Female*. Shell, seen laterally, subquadrangular in shape, a little higher in front than behind, greatest height considerably exceeding half the length, dorsal margin nearly straight in the middle, but gibbously produced both in front and behind, ventral margin slightly sinuated in the middle and curving evenly upwards behind, anterior extremity obliquely rounded off, posterior obtuse or slightly angular in the middle;—seen dorsally, irregularly ovate or somewhat hexagonal in outline, with the greatest width behind and slightly exceeding half the length, lateral edges angularly bent behind, anterior extremity abruptly contracted, posterior triangular. Surface of shell very uneven, each valve being provided dorsally, in front of the projecting supero postéal corner, with 2 successive very conspicuous nodiform protuberances, and more ventrally with a broad angular expansion continued in front as a well-marked ridge curving upwards to the ocular region; central part of valves transversally rugose; edges smooth and clothed in front and behind with scattered very fine hairs. Anterior antennæ with the terminal joint very narrow and fully as long as the preceding joint. Posterior antennæ with the apical claws gradually increasing in length distally. Posterior extremity of body terminating in 2 juxtaposed setæ.

*Male* of rather smaller size than female, with the shell less high and the dorsal margin slightly concaved. Copulative appendages of moderate size, basal part irregularly rounded, terminal part produced in front to a very long and thin lappet, behind to a short triangular corner.

Colour of shell fuscous grey; limbs colourless.

Length of adult female 0.65 mm.

*Remarks.*—This remarkable form was first described by Norman from specimens collected off the eastern coast of England, and was subsequently recorded by the present author under the name of *Cythere nodosa*. The peculiar rugose and tuberculated surface of the shell and the absolute absence of eyes

renders this form easily recognisable, from any of the species described in the preceding pages.

*Occurrence*.—Some few specimens of this Cytherid have been collected many years ago, partly in the Trondhjem Fjord, partly off the Lofoten islands (Odvær), from rather considerable depths ranging to 100 fathoms, muddy bottom.

*Distribution*.—British Isles.

*Fossil*.—Scotland.

#### Gen. 40. **Hemicythere**, G. O. Sars, n.

*Generic Characters*.—Shell of very solid consistency, calcareous, resembling somewhat in shape that of *Cythere*. Valves more or less unequal, with the surface distinctly pitted or roughly reticulate, marginal zone closely striated, edges densely hairy in front. Hinge with the closing teeth well developed. Eyes distinctly separated. Anterior antennæ with the terminal part 3-articulate, middle joint elongated, with 2 claw-like spines in front, last joint moderately produced. Posterior antennæ with 3 apical claws, the 2 proximal ones much thinner than the distal; flagellum in male normally developed, in female much shorter and somewhat thickened in the middle, with the extremity very delicate and blunted at the tip. Mandibles with the cutting part very coarse, palp almost straight, with the terminal joint comparatively short, vibratory plate small, with only a single plumose seta accompanied outside by a rudimentary hook-like spine. Maxillæ with the masticatory lobes comparatively short, palp of moderate size. Legs moderately strong, the 2 anterior pairs with 2 setæ on the anterior border of the basal part: last pair with only a single such seta. Caudal lamellæ small, with 2 plumose setæ on the tip. Copulative appendages of male with the terminal part well defined, triangular in shape.

*Remarks*.—This new genus is proposed to comprise a number of species generally referred by recent authors to the genus *Cythereis*, but differing from this genus, as defined by Jones, in several regards. It holds in reality an intermediate position between this genus and *Cythere* (in the restriction here adopted), approaching in some respects more closely to the latter genus. In the Fauna of Norway 8 species, referable to this genus, are represented.

#### 84. **Hemicythere villosa**, G. O. Sars.

(Pl. LXXXIV.)

*Cythere villosa*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 42.

*Specific Characters*.—*Female*. Shell, seen laterally, subreniform in shape, greatest height about in the middle and exceeding half the length, dorsal margin

gently arched and joining the posterior one without any intervening angle, ventral margin distinctly sinuated in front of the middle and slightly convex behind, anterior extremity broadly rounded and somewhat bowed below, posterior narrower and obliquely truncated, with the lower corner somewhat exerted, but obtuse at the end;—seen dorsally, oblong ovate in outline, with the greatest width behind the middle and somewhat less than half the length, anterior extremity pointed, posterior more obtuse. Surface of valves evenly convex and of a somewhat dull appearance, being all over conspicuously pitted and clothed at each extremity with closely set rather coarse hairs. Both pairs of antennæ very robust, the anterior ones with the last joint about half the length of the preceding one, the posterior ones with the flagellum scarcely extending to the middle of the terminal part.

*Male* of about same size as the female, but having the shell considerably narrower and more tapered behind. Copulative appendages with the terminal part produced in front to an acute triangular lappet, and crossed inside by 2 anteriorly-verging processes issuing from the basal part, the lower one highly chitinated and sharply pointed at the tip, the upper terminating in a narrow, slightly upturned lobule, which projects somewhat beyond the edge in front.

Colour of shell dark fuscous, with a distincte violaceous tinge, marginal zone lighter; limbs bright yellow.

Length of adult female 0.70 mm.

*Remarks.*—The present form resembles somewhat in the general shape of the shell *Cythere lutea*, but is at once distinguished by the very different sculpture of the valves and, when examined in the fresh state, also by the rather dissimilar colour. It is a true member of the genus *Hemicythere*, as here defined, agreeing in all structural details with the several species of this genus described in the sequel.

*Occurrence.*—The species occurs not unfrequently off the Norwegian coast, from the Christiania Fjord to Finmark in the laminarian region.

*Distribution.*—British Isles, Iceland, Bay of Biscay.

*Fossil.*—Norway, British Isles.

## 85. *Hemicythere emarginata*, G. O. Sars.

(Pl. LXXXV, fig. 1.)

*Cythereis emarginata*, G. O. Sars. Oversigt af Norges marine Ostracoder, p. 38.

*Specific Characters.*—*Female.* Shell, seen laterally, short subreniform in shape, somewhat higher in front than behind, greatest height considerably exceeding half the length, dorsal margin gently arched in the middle and



somewhat abruptly bent both in front and behind, ventral margin slightly sinuated in front and nearly straight behind, anterior extremity obliquely rounded off, posterior very distinctly emarginated in the middle, the emargination being bounded above by a somewhat gibbous corner, below by a projecting lobe obtusely truncated at the end;—seen dorsally, oblong ovate in outline, greatest width behind the middle and not nearly attaining half the length, side-edges somewhat angular behind, anterior extremity gradually narrowed and sharply pointed at the end, posterior obtusely triangular. Valves very unequal and rather dissimilar in shape, the right one having the dorsal margin much more strongly bowed in the middle than the left, whereas the anterior and posterior angles are nearly obsolete. Surface of shell somewhat uneven, each valve exhibiting behind a well-marked vertical ridge and below it a broad rounded expansion,<sup>1</sup> having moreover in front a few radiating folds; edges smooth and rather densely hairy in front and behind; sculpture well marked, resembling that in the preceding species. Antennæ comparatively less robust, than in *H. villosa*, but of a very similar structure; vesicle leading to the flagellum of the posterior ones however much larger and slightly bilobed.

*Male* somewhat smaller than female, but having the shell of a rather similar shape. Copulative appendages with the terminal part very sharply defined, and acutely produced both in front and behind.

Colour of shell dark fuscous.

Length of adult female 0.80 mm.

*Remarks.*—The present species is easily recognised by the very conspicuous emargination on the posterior extremity of the shell, especially strongly marked on the right valve, this character having indeed occasioned the specific name proposed. Otherwise it is rather closely allied to *H. villosa*, though of rather larger size.

*Occurrence.*—This is a true northern species. I have only taken it in the fresh state off the Lofoten islands and rather sparingly, whereas it occurred very abundantly in shell-sand from Øxfjord, Finmark.

*Distribution.*—Arctic Sea, Shetland.

*Fossil.*—Norway, Scotland.

## 86. *Hemicythere crenulata*, G. O. Sars.

(Pl. LXXXV, fig. 2).

*Cythereis crenulata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 39.

*Specific Characters.*—*Female.* Shell, seen laterally, oval subreniform in shape, somewhat higher in front than behind, greatest height exceeding half

the length, dorsal margin gibbously projecting in the ocular region, behind which it exhibits a distinct concavity, thence gently arched and joining the hind margin by an abrupt curve, ventral margin nearly straight, anterior extremity broadly rounded off, posterior obliquely truncated and very slightly emarginated in the middle, lower corner somewhat projecting, but obtuse at the end;—seen dorsally, oblong ovate in outline, with the greatest width behind and nearly attaining half the length, side-edges almost straight in the middle and slightly angular behind, anterior extremity obtusely pointed, posterior triangular. Valves less unequal than in the preceding species, with the surface slightly uneven, exhibiting in the posterior part, below, a broad rounded expansion, above a somewhat angular prominence, anterior edge and lower part of posterior regularly crenulated and clothed with fine hairs; sculpture less strongly marked than in the preceding species, the pittings being rather smaller and more densely set. Eyes rather large and conspicuous, elliptical in shape. Anterior antennæ nearly as in the preceding species, the posterior ones however with the apical claws comparatively more slender.

*Male* not yet observed.

*Remarks.*—The present species is nearly allied to *H. emarginata*, but of smaller size, and differing somewhat in the shape of the shell, as seen laterally, It is moreover easily distinguished by the well-marked crenulation of the anterior edges and the lower part of the posterior ones, this character having indeed given rise to the specific name proposed.

*Occurrence.*—I have only had an opportunity of examining a few female specimens of this form, taken several years ago at Langesund, south coast of Norway. Norman has however found it also in 2 localities of the western coast, Lervik and Korsfjord.

*Distribution.*—British Isles, Dawis Strait, Greenland.

## 87. *Hemicythere finmarchica*, G. O. Sars.

(Pl. LXXXV, fig. 3).

*Cythereis finmarchica*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 41.

*Specific Characters.*—*Female.* Shell, seen laterally, elongate subquadrangular in shape, slightly higher in front than behind, greatest height scarcely exceeding half the length, dorsal margin somewhat angularly bent in the ocular region, thence almost straight and gently sloping behind, ventral margin very slightly sinuated in front of the middle, anterior extremity broadly rounded, posterior rather narrower and obliquely truncated, with a very slight emargination

in the middle, upper corner obtuse, lower more prominent, but blunt at the end;—seen dorsally, subovate in outline, with the greatest width nearly equal to half the length, side-edges straight in the middle and scarcely at all angular behind, both extremities gradually contracted, the anterior more pointed than the posterior. Surface of valves rather evenly convex, with a very slight expansion below the posterior part, anterior edges and lower part of posterior very slightly and somewhat irregularly crenulated, being moreover clothed with fine hairs; sculpture well marked and of the usual kind. Anterior antennæ with the terminal joint rather small, scarcely exceeding in length  $\frac{1}{3}$  of the preceding joint. Posterior antennæ comparatively short and stout.

*Male* not yet examined in detail.

Colour of shell yellowish brown.

Length of adult female 0.74 mm.

*Remarks.*—The above-described species is easily distinguished from those recorded in the preceding pages by the rather narrow and elongated shape of the shell, and by the more evenly convex surface of the valves. The structure of the limbs is however not very different.

*Occurrence.*—This form was originally described from some empty shells found by my late father in shell-sand from Øxfjord, Finmark. I have subsequently had an opportunity of examining this form in the fresh and living state, a few female specimens being taken at Korshavn, south coast of Norway.

*Distribution.*—British Isles, Bay of Biscay, Cape Vert.

## 88. *Hemicythere quadridentata*, (Baird).

(Pl. LXXXVI, fig. 1).

*Cythere quadridentata*, Baird, British Entomostraca, p. 173, Pl. XXI, fig. 2.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong subquadrangular or somewhat clavate in shape, rather higher in front than behind, greatest height only slightly exceeding half the length, dorsal margin somewhat prominent in the ocular region and sloping gently behind at an almost straight course, ventral margin very slightly sinuated in front and quite straight behind, anterior extremity broadly rounded, posterior much narrower and obliquely truncated, upper corner rounded off, lower somewhat produced and blunt at the end;—seen dorsally, narrow and somewhat irregularly oblong in outline, greatest width not nearly attaining half the length, side-edges angularly waved, both extremities somewhat blunt at the end. Surface of shell rather uneven, each valve exhibiting in the posterior part, above a somewhat projecting



angular prominence, below a broad rounded expansion, anterior edge densely fringed with hairs, posterior more sparingly hairy, but divided at the end of the lower projecting corner into 4 very conspicuous obtuse teeth. Sculpture well-marked and of the usual appearance. Antennæ moderately strong, the anterior ones with the terminal joint nearly half the length of the preceding joint, the posterior ones with the apical claws comparatively short, flagellum more prolonged than in the other species, extending considerably beyond the middle of the penultimate joint.

*Male* rather smaller than female, and having the shell comparatively narrower. Copulative appendages with the terminal part obtusely triangular in shape.

Colour of shell yellowish brown.

Length of adult female 0.72 mm.

*Remarks.*—The present species was described as early as the year 1850 by Baird, and was chiefly characterised by the lower corner of the posterior extremity having the edge divided into 4 blunt teeth. The form examined by me agrees in this character, as also in the general shape of the shell pretty well with the specimen originally described and figured by Baird; but Brady has recorded some apparently more deviating forms adduced to this species.

*Occurrence*—The species seems to be of rather rare occurrence on the coasts of Norway. I have only met with it quite occasionally in a single locality, viz., at Risør, south coast of Norway, and Norman has taken a few specimens at Lervik, Hardanger Fjord.

*Distribution.*—British Isles, Bay of Biscay.

*Fossil.*—Scotland.

## 89. *Hemicythere angulata*, G. O. Sars.

(Pl. LXXXVI, fig. 2).

*Cythereis angulata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 46.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong subreniform in shape, much higher in front than behind, greatest height about equal to half the length, dorsal margin angularly bent in the ocular region and gently arched in the middle, sloping rather steeply behind, ventral margin distinctly sinuated in front, but nearly straight behind, anterior extremity broadly rounded and somewhat bowed below, posterior much narrower and obliquely truncated, without any obvious emargination in the middle, lower corner somewhat projecting and blunt at the end;—seen dorsally, of a shape rather similar to that

in the preceding species, but comparatively broader and more pronouncedly angular. Surface of shell rather uneven in its posterior part, each valve exhibiting above a distinctly angular prominence, and below a likewise somewhat angular expansion, anterior edge densely fringed with hairs, lower part of posterior edge more sparingly hairy and without any distinctly marked teeth; sculpture as in the preceding species. Antennæ comparatively shorter and stouter, terminal joint of the anterior ones not nearly attaining half the length of the penultimate one, flagellum of the posterior antennæ much shorter than in the preceding species.

*Male* of rather small size, as compared with the female, with the shell much narrower. Copulative appendages differing conspicuously from those of the preceding species in the shape of the terminal part, the anterior extremity of which is peculiarly bent in a hamiform manner.

Colour of shell reddish brown.

Length of adult female 0.69 mm.

*Remarks.*—The present species is nearly allied to the preceding one, but of somewhat smaller size, and slightly differing in the shape of the shell. It also differs in the want of any distinct teeth on the posterior edges of the valves.

*Occurrence.*—I have taken this form in several places on the Norwegian coast, from the Christiania Fjord to Finmark, in the laminarian zone, though nowhere in any abundance.

*Distribution.*—British Isles, Baffin's Bay.

*Fossil.*—Scotland.

#### 90. *Hemicythere latimarginata*, (Speyer).

(Pl. LXXXVI, fig. 3).

*Cythere latimarginata*, Speyer, Die Ostracoden der Casseler Tertiärbildungen, p. 22, Pl. III, fig. 3 a—d.

Syn: *Cythereis abyssicola*, G. O. Sars.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong quadrangular in shape, somewhat higher in front than behind, greatest height quite anteriorly and slightly exceeding half the length, dorsal margin projecting in the ocular region to a very conspicuous gibbous prominence, behind which it appears distinctly concaved, being only in its posterior part somewhat convex, ventral margin rather deeply sinuated in the middle, anterior extremity unusually short, being bluntly rounded off and considerably bowed below, posterior extremity almost transversely truncated, with the lower corner but slightly produced and evenly rounded off;—seen dorsally, irregularly oval in outline, with the greatest

width about half the length and the side-edges conspicuously angular, anterior extremity bluntly truncated at the end, posterior sharply defined in front and likewise bluntly truncated. Surface of shell rather uneven, each valve exhibiting posteriorly, as in the 2 preceding species, an angular dorsal prominence and a likewise somewhat angular subventral expansion, the anterior part being moreover slightly umbonate laterally; edges smooth and rather densely hairy at each extremity; sculpture well marked, of the usual kind. Antennæ unusually slender, terminal joint of the anterior ones exceeding half the length of the preceding joint; flagellum of the posterior ones very short.

*Male* a little smaller than female, with the shell comparatively narrower and the dorsal margin more pronouncedly concaved in front. Copulative appendages with the terminal part rather large and acutely produced in front; basal part sending off below 2 unequal processes, the anterior one somewhat spoon-shaped and curving forwards inside the terminal part, the other pointing straight downwards and somewhat pyramidal in shape.

Colour of shell light fuscous.

Length of adult female 0.70 mm.

*Remarks.*—This form was recorded as early as the year 1863 by Speyer from some fossil specimens found in tertiary deposits at Cassel, and was subsequently observed by the present author in the living state, being described under the name of *Cythereis abyssicola*. It is an easily recognisable species, differing conspicuously from the other known forms in the shape of the shell.

*Occurrence.*—I have myself only met with this species in a single locality of the Norwegian coast, viz., off the Lofoten islands, where it occurred in very considerable depths, down to 300 fathoms. Norman has however found it also in some places on the western coast.

*Distribution.*—British Isles, Dawis strait, Greenland, Spitsbergen.

*Fossil.*—Germany.

# 91. *Hemicythere concinna*, (Jones).

(Pl. LXXXVII, fig. 1).

*Cythere concinna*, Jones, Monogr. Tert. Entomostraca, p. 29, Pl. IV, fig. 7 a—f.

Syn: *Cythereis clavata*, G. O. Sars.

*Specific Characters.*—*Female*. Shell, seen laterally, pronouncedly clavate in shape, much higher in front than behind, greatest height exceeding somewhat half the length, dorsal margin angularly bent in the ocular region and sloping gradually behind, ventral margin almost quite straight, anterior extre-



mity broadly and somewhat obliquely rounded, posterior much narrower and almost transversely truncated, upper corner obtuse, lower a little more prominent and rounded off at the end;—seen dorsally, irregularly oblong in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length, side-edges somewhat bowed in front of the middle and slightly angular behind, both extremities obtusely truncated, the posterior a little broader than the anterior. Surface of valves with somewhat irregular and densely set pittings, less conspicuous than in the preceding species, and moreover marked with scattered small tubercles, edges quite smooth and rather densely hairy in front and behind. Hinge with the closing teeth very strongly developed. Anterior antennæ with the terminal joint somewhat prolonged, exceeding considerably half the length of the preceding joint. Posterior antennæ with the apical claws rather slender, flagellum short and scarcely thickened in the middle.

*Male* of about same size as female, but having the shell comparatively narrower, with the dorsal margin perfectly straight. 2nd pair of legs slightly transformed, the apical claw being abruptly curved and armed with about 8 thin spinules gradually diminishing in length distally. Copulative appendages with the terminal part remarkably small, obtusely triangular in shape.

Colour of shell dark fuscous brown, with the marginal zone lighter; limbs bright yellow.

Length of adult female 0.95 mm.

*Remarks.*—This form was recorded as early as the year 1856 by Jones from fossil tertiary shells. It was subsequently observed by the present author in the living state, and described under the name of *Cythereis clavata*. The species is easily recognised from the other known forms of the present genus by the very coarse and pronouncedly club-shaped shell.

*Occurrence.*—I have taken this form very abundantly in the upper part of the Christiania Fjord at a depth of 7—12 fathoms, muddy bottom. It also occurs in many other places on our coast up to Finmark.

*Distribution.*—British Isles, Gulf of St. Lawrence, Dawis Strait, Spitzbergen.

*Fossil.*—Norway, Scotland.

## 92. *Hemicythere oblonga*, (Brady).

(Pl. LXXXVII, fig. 2).

*Cythere oblonga*, Brady, Trans. Zool. Soc. London, Vol. V, p. 373, Pl. 59, fig. 5 a—d.

*Specific Characters.*—*Female.*—Shell somewhat tumid, seen laterally, rather regularly oblong oval in shape, slightly higher in front than behind, greatest

height scarcely exceeding half the length, dorsal margin with a slight indication to an angle in the ocular region and gently sloping behind, ventral margin slightly sinuated, anterior extremity obliquely rounded, posterior a little narrower and obtusely blunted, with the lower corner not at all produced;—seen dorsally, broadly oval in outline, with the greatest width in the middle and exceeding somewhat half the length, side-edges quite evenly curved, both extremities obtusely pointed, the anterior narrower than the posterior. Surface of valves evenly convex, but coarsely sculptured throughout with very conspicuous and somewhat irregular pits defined by a network of thickened stripes, anterior edges and lower part of posterior divided into densely set obtuse denticles and fringed with scattered very fine hairs, posterior part of ventral margin distinctly jagged. Anterior antennæ with the terminal joint comparatively small, scarcely attaining half the length of the preceding joint. Posterior antennæ with the apical claws short and stout, flagellum remarkably thickened in the middle.

*Male*, as usual, having the shell comparatively more elongate than in female, but otherwise of a very similar appearance. Copulative appendages rather large, but resembling in shape those of *H. concinna*, the terminal part being very poorly developed.

Colour of shell yellowish brown.

Length of adult female 0.96 mm.

*Remarks*.—In the general shape of the shell this form has a perplexing similarity to some of the species of the genus *Cytheridea*, for instance the above-described *C. papillosa*. It is however at once distinguished by the very different sculpture of the valves, agreeing in this respect, as also in the structure of the several limbs perfectly with the other species of the present genus.

*Occurrence*.—The only place, where I have met with this distinct species, is at Korshavn, south coast of Norway. Several specimens, both males and females, were taken here, some years ago, in a depth of about 20 fathoms, muddy bottom.

*Distribution*.—British Isles, Bay of Biskay, Mediterranean.

## Gen. 41. *Cythereis*, Jones, 1849.

*Generic Characters*.—Surface of shell more generally rather uneven, with variously formed projections or spines, anterior and posterior edges always strongly denticulated; sculpture less coarsely marked than in the preceding genus, in some cases quite inconspicuous. Hinge with the closing teeth well developed. Eyes, when present, very conspicuous and adjacent to pellucid

tubercles of the valves. Anterior antennæ with the terminal part distinctly 4-articulate, last joint more or less prolonged. Posterior antennæ with the apical claws rather slender; flagellum poorly developed in both sexes, with the distal part of a remarkably weak consistency. Mandibles with the cutting part less strong than in *Hemicythere*, palp having the terminal joint much prolonged and curved; vibratory plate rather fully developed, being fringed with 5 setæ, 3 apical and 2 lateral, one of the latter rudimentary. Maxillæ about as in *Hemicythere*. Legs rather slender. Caudal lamellæ conical in shape, with 2 rather unequal apical setæ and one lateral. Copulative appendages of male of somewhat varying shape in the different species.

*Remarks.*—This genus was established as early as the year 1849 by Jones, to comprise some of the fossil *Cytheridæ* examined by him, in which the shell exhibited a particularly rough and spiny surface. The close relationship of this genus to *Cythere* was stated by the present author, on examining the limbs in some recent species, though a few differences were found chiefly relating to the structure of the flagellum of the posterior antennæ. On that reason the genus was supported by me, as also subsequently by G. W. Müller, but was taken by both of us in a much wider sense than done by Jones. Brady however did not at all admit this genus, which he combined with *Cythere*. In the present account the extent of the genus has been considerably limited by the establishment of the new genus *Hemicythere*, the species of which were formerly included in *Cythereis*. The chief differences between these 2 genera are found in the structure of the anterior antennæ and of the mandibles. Another characteristic difference has also recently been stated relative to the flagellum of the posterior antennæ, which in the present genus is very poorly developed not only in the female, but also in the male. 5 species referable to this genus will be described in the sequel.

### 93. *Cythereis tuberculata*, G. O. Sars.

(Pl. LXXXVIII).

*Cythereis tuberculata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 37.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong subclavate in shape, gradually tapered behind, greatest height quite in front and only slightly exceeding half the length, dorsal margin distinctly angular in the ocular region and sloping behind at nearly a straight course, ventral margin very slightly sinuated in the middle and curving gently upwards behind, anterior extremity broadly rounded off, posterior much narrower and obtusely blunted, upper corner obtuse, lower rounded off;—seen dorsally, somewhat irregularly oblong



oval in outline, being slightly constricted in the middle and obtusely angular in the posterior part, greatest width rather behind and not fully attaining half the length, both extremities somewhat blunted at the end, the anterior narrower than the posterior. Surface of valves only slightly uneven, and faintly reticulated, being marked with somewhat irregular pittings and scattered small tubercles, anterior edges and lower part of posterior armed with a very conspicuous and rather regular row of somewhat blunt denticles, but only sparingly hairy. Eyes well developed. Anterior antennæ with the 4 joints of the terminal part well defined, last joint scarcely as long as the 2 preceding ones combined. Posterior antennæ moderately strong, with the flagellum quite short, scarcely extending to the middle of the penultimate joint. Legs somewhat less slender than in the other species.

*Male* a little larger than female, and having the shell comparatively narrower. Flagellum of posterior antennæ more prolonged than in female, but with the distal part very thin and fragile. Copulative appendages largely developed and of a rather unusual shape, the basal part being produced below to a greatly prominent and complicated lobe, obtuse at the end, and exerted behind to a thin digitiform lappet, in front to a much stronger hooked process; terminal part remarkably narrow and prolonged, tapering gradually to a thin somewhat flexuous lash.

Colour of shell dark yellowish brown; limbs bright yellow.


Length of adult female slightly exceeding one millimeter.

*Remarks.*—In the general appearance of the shell and its sculpture this form bears a rather close resemblance to the species of the preceding genus, and might indeed, without a closer examination, easily be adduced to that genus. Yet, the structure of the antennæ and the mandibles is decidedly different and proves it to be in reality referable to the genus *Cythereis*, as here defined.

*Occurrence.*—This form is by no means rare off the Norwegian coast. I have taken it in many places, from the Christiania Fjord up to Finmark in depths ranging from 10 to 30 fathoms, muddy bottom.

*Distribution.*—British Isles, Iceland, Spitzbergen, Gulf of Lawrence, Bay of Biscay, Mediterranean.

*Fossil.*—Norway, British Isles.

94. *Cythereis echinata*, G. O. Sars.(Pl. LXXXIX). *Cythereis echinata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 44.Syn: *Cythere catenata*, Brady.„ — *irpex*, Brady.„ — *monacantha*, Brady.

*Specific Characters.—Female.* Shell rather clumsy and tumid, seen laterally, broadly oval in shape, slightly higher in front than behind, greatest height about equal to  $\frac{3}{5}$  of the length, dorsal margin projecting in the ocular region to a very distinct gibbous prominence, immediately behind which it appears slightly concaved, thence gently arched and joining the hind edge without any intervening angle, ventral margin scarcely at all sinuated, being slightly convex behind, anterior extremity broadly rounded; posterior rather narrower and obtusely blunted, with the lower corner evenly rounded off;—seen dorsally, broadly ovate in outline, with the greatest width somewhat behind the middle and exceeding half the length, side-edges evenly curved, anterior extremity gradually narrowed to an obtuse point, posterior broader and more blunt at the tip. Surface of valves evenly convex and everywhere armed with numerous sharply pointed spines, those on the anterior edges pretty regularly disposed, those on the posterior extremity somewhat unequal, 2 or 3 of them at the infero-posteal corner being rather stronger than the others; sculpture rather feeble, in the form of slightly defined areolæ arranged somewhat concentrically. Eyes apparently quite absent. Anterior antennæ with the terminal joint much prolonged, being fully as long as the 2 preceding joints combined. Posterior antennæ very slender, with the penultimate joint remarkably long and narrow, apical claws much elongated; flagellum however rather short. Legs slender, and rapidly increasing in length posteriorly.

*Male* resembling the female in the general appearance, though having the shell comparatively somewhat more elongated, with the dorsal margin more distinctly concaved in front. Flagellum of posterior antennæ still more reduced than in female, being both shorter and thinner. Copulative appendages with the basal part rounded triangular in shape and not at all produced below, but armed in front with a small dentiform projection; terminal part comparatively large, broadly oval in shape and not obviously produced either in front or behind.

Colour of shell dark fuscous gray.

Length of adult female 1.20 mm., of male 1.25 mm.

*Remarks.*—This is a very distinct and easily recognisable species, being well distinguished from the other known members of the present genus by the

short and clumsy shape of the shell and by its strongly spinous armature. It is one of the largest forms of known Cytheridæ.

*Occurrence.*—I have taken this form occasionally in the upper part of the Christiania Fjord in depths of 30 to 50 fathoms, muddy bottom, and also off the Lofoten islands, where it descends to the considerable depth of 300 fathoms. Norman records it also from some localities on the western coast of Norway.

*Distribution.*—Great depths of the Atlantic (Challenger Expedition).

### 95. *Cythereis dunelmensis* (Norman).

(Pl. XC.) 

*Cythere dunelmensis*, Norman, Nat. Hist. Trans. of Northumb. & Durham, Vol. I, pag. 23, Pl. VII, figs. 1—4.

Syn: *Cythereis horrida*, G. O. Sars.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong quadrangular in shape, rather higher in front than behind, greatest height somewhat exceeding half the length, dorsal margin strongly prominent in the ocular region and sloping gently behind at nearly a straight course, ventral margin slightly sinuated in the middle, anterior extremity broadly rounded, posterior rather narrower and nearly transversely truncated, upper corner well marked, lower rounded off;—seen dorsally, rather regularly oblong oval in outline, with the greatest width about in the middle and somewhat less than half the length, both extremities obtusely pointed and nearly equal. Surface of valves evenly convex but armed with numerous clumsy spines of somewhat unequal size and irregular shape, some of them arranged more regularly in a curved series near the anterior extremity, edges of the latter fringed with a likewise regular row of somewhat spatulate denticles, successively increasing in size downwards, posterior extremity with spines of somewhat varying shape, some of them, at the infero-posteal corner, rather prolonged; hairy coating rather sparse. Sculpture of valves distinctly reticulate. Eyes very large and conspicuous, with a glittering lustre. Anterior antennæ with the terminal joint rather prolonged, though scarcely attaining the length of the 2 preceding joints combined. Posterior antennæ with the penultimate joint less slender than in *C. echinata*, flagellum very short. Legs moderately slender, with the 1st joint of the terminal part clothed in front with fascicles of thin bristles.

*Male* of about same size as female, but having the shell conspicuously narrower and more elongate in shape, some of the spines on the hinder part of the ventral face being arranged on each side in a pretty regular series well



seen in the ventral aspect of the shell, each series containing 6—8 spines successively increasing in size posteriorly. Flagellum of posterior antennæ very little longer than in female. Copulative appendages with the basal part slightly projecting below, terminal part subtriangular in shape, obtusely produced both in front and behind.

Colour of shell whitish, with a slight yellow tinge, but in most cases appearing much darker owing to muddy particles adhering to the numerous spines on the surface of the shell; limbs bright yellow.

Length of adult female amounting to 0.92 mm., of male to 0.95 mm.

*Remarks.*—This form was first recorded by Norman as a species of the genus *Cythere*, and was somewhat later observed by the present author, who described it under the name of *Cythereis horrida*, the specific denomination alluding to the coarse spinous armature of the shell. It is a true member of the present genus, but easily recognisable from the other species.

*Occurrence.*—I have taken this form not unfrequently in several places on the Norwegian coast, from the Christiania Fjord up to Finmark. It is generally found in depths ranging from 10 to 50 fathoms, muddy bottom.

*Distribution.*—British Isles, Iceland, Baffins Bay, Spitzbergen.

*Fossil.*—Scotland.

## 96. *Cythereis Jonesi*, Baird.

(Pl. XCI.)

*Cythere Jonesi*, Baird, British Entomostraca, p. 175, Pl. XX, fig. 1.

Syn: *Cythere fimbriata*, Norman.

“ — *ceratoptera*, Bosquet.

• *Cythereis spectabilis*, G. O. Sars.

*Specific Characters.*—*Female.* Shell, seen laterally, obtusely quadrangular or auriculate in shape, higher in front than behind, greatest height exceeding somewhat half the length, dorsal margin angularly produced in the ocular region and nearly straight behind, sloping gently towards the supero-posteal corner, ventral margin scarcely at all sinuated, being even a little convex throughout, anterior extremity broadly rounded, posterior rather narrower and likewise obtusely rounded off;—seen dorsally, somewhat lozenge-shaped or trapezoid in outline, widening gradually from before backwards to about the posterior third part of the length, whence it abruptly contracts behind, both extremities somewhat blunt at the end. Valves comparatively thin, semipellucid, but armed with a somewhat limited number of very conspicuous spines, pretty regularly arranged; each valve exhibiting laterally, near the ventral face, a well-

marked wing-like expansion terminating in a strong obliquely outward-pointing spiniform process, and bordered in front of this process with a regular series of about 8 somewhat flattened spines extending to the anterior extremity; upper part of each valve with a longitudinal row of 6 lamellar spines, the foremost one rather broad and conically produced behind, the hindmost occupying the supero-posteal corner of the valve; anterior edge flanked above by a thin undivided lamella angularly projected just above the eye, lower part of the edge armed with about 8 somewhat blunt denticles; posterior edge bordered with 6 spines successively increasing in size downwards, the lowermost being considerably prolonged; central portion of valves perfectly smooth and without any obvious sculpture, only exhibiting in its hindmost part a few comparatively small spines; hairy coating of the valves very scarce. Eyes, as in the preceding species, very large and conspicuous. Antennæ rather slender, resembling in structure those in *C. dunelmensis*. Legs with the 1st joint of the terminal part quite smooth in front.

*Male* very similar to the female, though having the shell a little more elongate. Flagellum of posterior antennæ scarcely larger. Right 2nd leg conspicuously more strongly built than the others. Copulative appendages with the terminal part much produced in front and exerted behind to a narrow digitiform process.

*Youngs*, recently hatched, of a rather peculiar appearance, having the winglike expansions of the valves strongly prominent and flanked with a quite undivided thin lamella, anterior edges likewise with all the denticles confluent. In somewhat older youngs the terminal spine of the wing-like expansions has however become well defined.

*Remarks.*—This remarkable form was recorded as early as the year 1850 by Baird from a single empty shell. It was however not recognised by the subsequent authors, owing to the rather imperfect description and figure given by Baird, being indeed described as new under 3 different names, as seen from the above-given synonymes. Brady has however ascertained the identity of the present species with the form originally examined by Baird and has restored the specific name given to it by that author.

*Occurrence.*—I have taken this form occasionally in the upper part of the Christiania Fjord in depths of from 30 to 50 fathoms, muddy bottom, and I have also met with it in some other places on the south and west coasts of Norway.

*Distribution.*—British Isles, Bay of Biscay, Mediterranean.

*Fossil.*—British Isles, Belgium, France.

97. *Cythereis mucronata*, G. O. Sars.

(Pl. XCII.)

*Cythereis mucronata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 48.Syn: *Cythere spinosissima*, Brady.

*Specific Characters.*—*Female.* Shell of an appearance rather similar to that in the preceding species, though comparatively somewhat more elongate; seen laterally, oblong quadrangular in shape, with the greatest height in front and but very little exceeding half the length, dorsal margin straight or slightly concaved, sloping gently towards the rather prominent supero-posteal corner, ventral margin distinctly convex in its anterior part, anterior extremity broadly rounded, posterior much narrower and obtusely truncated, with the lower corner rounded off;—seen dorsally, pronouncedly lozenge-shaped, the side-edges being angularly bent behind the middle, both extremities somewhat blunt at the ends. Valves of firmer consistency than in *C. Jonesi* and quite opacous, each exhibiting laterally, near the ventral face, a well-marked wing-like expansion terminating in a strong sharply pointed spiniform process, and bordered with a regular row of somewhat spatulate spines continued for some distance upwards along the anterior extremity, frontal edges of the valves, as in the preceding species, provided above with a thin undivided crest terminating just above the eye-tubercle in a sharp corner, lower part of the edges bordered with a regular series of densely set strong denticles; posterior edges armed with 6—8 somewhat unequal spines, the lowermost particularly strong and sharply pointed. Lateral faces of the valves rough from numerous somewhat irregular, more or less squamiform prominences, those nearest the dorsal margin of each valve being however of a more uniform appearance and arranged in a regular longitudinal row. Eye-tubercles well marked, though somewhat smaller than in *C. Jonesi*. Structure of the several limbs very similar to that in the said species.

*Male* slightly larger than female, and having the shell somewhat more elongate in shape. Legs exactly as in female, the 2nd pair not being transformed. Copulative appendages only slightly differing from those in the preceding species, basal part however more triangular in shape, and terminal part obtusely produced behind.

Youngs, recently hatched, as in the preceding species, with the spines bordering the anterior edges and the lateral expansions of the valves replaced by undivided thin marginal lamellæ, the expansions being however less produced than in the youngs of *C. Jonesi*.

Colour of shell dark fuscous.

Length of adult female 1.10 mm.



*Remarks.*—The above-described species is closely allied to *C. Jonesi*, but of somewhat larger size and moreover easily distinguished by the numerous scale-like prominences on the lateral faces of the valves, as also by the mucronated shape of the spine attached to the infero-posteal corner and of that terminating the lateral expansions of the valves.

*Occurrence.*—The only place where I have met with this form is at Skraaven, Lofoten islands. It was found here occasionally in the considerable depth of 200—300 fathoms, muddy bottom. Norman has however taken it also at Stoksund, west coast of Norway.

*Distribution.*—Shetland.

*Fossil.*—Belgium.

## Subfam. 4. Cytherurinae.

*Remarks.* This subfamily has been proposed by G. W. Müller, but I do not find that its real extent is clearly defined. As far as I understand, it is taken by that author in a very wide sense. In the present account this subfamily is restricted to comprise a number of very small Cytheridae, chiefly referable to the genus *Cytherura*, G. O. Sars. The subfamily is well distinguished from the 3 preceding ones, both as to the shell and to the structure of the limbs.

### Gen. 42. *Cytherura*, G. O. Sars, 1865.

*Generic Characters.*—Shell, as a rule, comparatively thin, only slightly calcareous, terminating behind in a more or less sharply defined obtuse protuberance, surface smooth or slightly reticulated, often with longitudinal folds, which in some cases are elevated to sharp keels. Hinge imperfectly developed. Eyes distinctly separated. Anterior antennæ rather feeble, with the terminal part gradually attenuated, 4-articulate, and clothed in front with scattered comparatively short setæ. Posterior antennæ with the penultimate joint distinctly subdivided, apical claws short, flagellum well developed in both sexes. Mandibles very strong, with the cutting teeth blunt and more or less reduced in number, palp 4-articulate, with none of the setæ particularly prolonged, vibratory plate very small, with only a single distinctly developed seta. Maxillæ with both the palp and the masticatory lobes narrowly produced, the 2 lowermost of the setæ bordering the vibratory plate quite naked and turned downwards. Legs not

much prolonged, 1st pair with a single seta on the anterior border of the basal joint, 2nd pair with 2 such setæ, last pair with no seta on this border. Caudal lamellæ very small and simply rounded, without any marginal bristles. Copulative appendages of male distinguished by a very conspicuous dark-coloured string issuing from the lower face of the basal part and more or less spirally convoluted at the base.

*Remarks.*—This genus was established in the year 1865 by the present author, and has been admitted by all subsequent authors in the sense originally adopted. The generic name alludes to the peculiar protuberance of the hind extremity of the shell found, more or less distinctly defined, in all the known species. The genus is very rich in species, most of them being found in rather shallow water among algæ. In the succeeding pages 12 species referable to this genus will be described, and Norman has also recorded from the Norwegian coast a few other species not yet observed by me.

98. *Cytherura gibba*, (O. Fr. Müller).

(Pl. XCIII).

*Cythere gibba*, O. Fr. Müller, Entomostraca, p. 66, Pl. VII, figs. 7–9.

Syn: *Cythere gibbera*, O. Fr. Müller (male).

„ *Robertsoni*, Brady ♀.

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally oblong subreniform in shape, scarcely higher in front than behind, greatest height about equalling half the length, dorsal margin only slightly bent in the ocular region and perfectly straight in the middle, joining the hind margin by a quite gentle curve, ventral margin distinctly sinuated in front and somewhat bowed behind, anterior extremity broadly rounded, posterior gradually contracted to an obtuse protuberance located in the longitudinal axis of the shell;—seen dorsally, broadly ovate in outline, with the greatest width behind the middle and rather exceeding half the length, side-edges abruptly bowed behind, both extremities sharply pointed at the end, the anterior somewhat narrower than the posterior. Valves only slightly unequal, each exhibiting behind the middle a very conspicuous rounded tuberosity, surface otherwise quite evenly convex, without any obvious folds, but with indication to a faint reticulate pattern; edges smooth and clothed with scattered hairs. Eyes comparatively small, but well observable in fresh specimens. Anterior antennæ with the terminal joint rather prolonged, being fully as long as the preceding joint. Posterior antennæ comparatively slender, with the penultimate joint distinctly subdivided in the middle by an oblique suture. Legs of moderate length.

*Male* conspicuously differing from the female in the shape of the shell, which, seen laterally, is comparatively narrower, with the dorsal margin slightly concave and the ventral more deeply sinuated; seen dorsally, rather swollen behind, but gradually tapered anteriorly, without any trace of the lateral tuberosities occurring in female. Sculpture of valves very strongly marked in form of a rather regular reticulation. Copulative appendages very large and complicate, basal part rounded quadrangular in shape, and sending off at the junction with the terminal part a slender posteriorly pointing process, somewhat elbowed in the middle and abruptly hooked at the extremity; copulatory string of quite an extraordinary length, spirally convoluted at the base and ascending upwards to the dorsale face of the basal part, terminating in a very thin point; terminal part obtusely rounded off in front, but irregularly indented behind, the lower corner being produced to a somewhat digitiform narrow process, above which is a curved spine and 2 rounded lobules.

Colour of shell very dark, almost black, but with the tips of both extremities and an oblique band across the back whitish.

Length of adult female 0.56 mm.

*Remarks.*—This form has been recorded as early as the year 1785 by O. Fr. Müller, and ought thus more properly to be regarded as the type of the present genus. Another supposed species, named by that author *Cythere gibbera*, has turned out to be the male of the present form. It is an easily recognisable species, being well distinguished from the other known members of the present genus by the shape and sculpture of the shell, as also by its peculiar colour.

*Occurrence.*—In habits the present species ought more properly to be regarded as a brackish-water form, being found most abundantly in places where the salinity of the water is much reduced. I have myself only met with it in the upper part of the Christiania Fjord, near the town, where a few specimens were taken, many years ago, close to the beach among *Zostera*. According to Zencker this form is viviparous, a particularity not observed in any of the other known species.

*Distribution.*—Kattegat, Baltic, Finland, British Isles, Holland.

*Fossil.*—Norway, Scotland.



99. *Cytherura nigrescens*, (Baird).

(Pl. XCIV, fig. 1).

*Cythere nigrescens*, Baird, British Entomostraca, p. 171, Pl. XXI, figs. 4, 4 a.

*Specific Characters.*—*Female.* Shell rather compressed, seen laterally, oval in shape, about equally high in front and behind, greatest height slightly exceeding half the length, dorsal margin gently arched, joining the anterior and posterior edges without any intervening angle, but sloping somewhat more steeply behind than in front, ventral margin slightly sinuated in the middle, anterior extremity rounded off, posterior exerted to a well defined conical protuberance somewhat obliquely truncated at the tip and located about in the longitudinal axis of the shell;—seen dorsally, narrow oblong in outline, with the greatest width somewhat behind the middle and about equalling  $\frac{2}{5}$  of the length, side-edges rather evenly curved, both extremities pointed, the anterior somewhat narrower than the posterior. Valves slightly unequal and rather thin, with the surface quite smooth, without any obvious sculpture, being only marked by scattered small knobs; inner duplicatures remarkably broad, that in front limited inwards by a somewhat irregularly waved line sending off to the edge a number of very conspicuous fine pore-channels partly arranged in bundles, that of the hind extremity strongly bowed inwards; edges smooth and clothed with scattered very fine hairs. Anterior antennæ very slender, with the terminal joint rather small, not nearly attaining half the length of the preceding joint. Posterior antennæ with the dividing suture of the penultimate joint located considerably above the middle. Legs comparatively small.

*Immature specimens* conspicuously differing from the adults in the shape of the shell, which gradually tapers behind to an obtuse point, the dorsal margin being boldly and evenly arched, whereas the ventral one is nearly straight.

*Male* very like the female, but of smaller size, and having the shell, seen laterally, somewhat narrower, with the dorsal margin nearly straight. Copulative appendages rather unlike those of the preceding species, basal part obliquely oval in shape and without any processes below, copulatory string comparatively short, bent in a circle, with the extremity deflexed; terminal part rather small, securiform in shape.

Colour of shell in the greater extent very dark, almost black, extremities however much lighter and semipellucid.

Length of adult female scarcely exceeding 0.43 mm.

*Remarks.*—This form also has been recorded at a rather early date, viz., in the year 1850, being described by Baird as a species of the genus *Cythere*.

It is easily distinguished from the preceding species by its much smaller size and rather different shape of the shell.

*Occurrence*.—The present species is very common on the Norwegian coast, being found rather abundantly everywhere in the littoral zone, and often left in tidal pools. It is one of our smallest Ostracoda, the specimens being only visible to the naked eye as small dark points moving slowly on the bottom or along the algæ growing on it.

*Distribution*.—British Isles, Holland, Fosse de Cap Breton, Bay of Biscay.

*Fossil*.—Norway, British Isles, Canada.

#### 100. *Cytherura similis*, G. O. Sars.

(Pl. XCIV, fig. 2).

*Cytherura similis*, G. O. Sars, Oversigt af Norges marine Ostracoder p. 72.

Syn: *Cytherura propinqua*, Brady.

„ — *Sarsii*, Brady.

*Specific Characters*.—*Female*. Shell somewhat less compressed than in *C. nigrescens*, seen laterally, oval subreniform in shape, greatest height somewhat exceeding half the length and occurring in the middle, dorsal margin only slightly arched and sloping quite equally to both extremities, ventral margin distinctly sinuated in the middle and somewhat bowed behind, anterior extremity broadly rounded, posterior only very slightly exerted, though exhibiting in the middle a quite short and obtuse protuberance;—seen dorsally, oblong oval in outline, with the greatest width behind the middle, posterior extremity more abruptly contracted than the anterior. Surface of valves nearly smooth, with only faint trace of a reticulation behind; inner duplicatures comparatively less broad than in the preceding species and more regularly defined inwards. Antennæ of a structure very similar to that in the said species; defining suture of the penultimate joint of the posterior ones however occurring exactly in the middle.

*Male* not yet observed.

Colour of shell much paler than in *C. nigrescens*.

Length of adult female 0.54 mm.

*Remarks*.—As indicated by the specific name proposed, this form exhibits an appearance somewhat similar to that of *C. nigrescens*. It is however of much larger size, and differs moreover conspicuously in the shape of the shell, as seen laterally, being in particular distinguished by the comparatively much shorter and blunter protuberance of the hind extremity.

*Occurrence.*—Only very few specimen of this form have as yet come under my notice, all of the female sex. They were taken, many years ago, in the upper part of the Christiania Fjord in a depth of a few fathoms. Some empty shells were moreover found by my late father in shell-sand from Øxfjord, west Finmark.

*Distribution.*—British Isles, Arctic Sea.

*Fossil.*—Norway, Scotland.

# 101. *Cytherura sella*, G. O. Sars.

(Pl. XCV, fig. 1).

*Cytherura sella*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 73.

Syn: *Cytherura cuneata*, Brady.

„ „ *flavescens*, Brady.

*Specific Characters.*—*Female.* Shell somewhat compressed, seen laterally, oval subquadrangular in shape, scarcely higher in front than behind, greatest height about equal to half the length, dorsal margin quite straight in the middle joining the hind edge by an even curve, but more abruptly bent in front, with indication to an angle in the ocular region, ventral margin gently sinuated in the middle and joining the hind edge by a bold curve, anterior extremity obtusely rounded, posterior exerted to a well defined and rather narrow protuberance located distinctly above the longitudinal axis of the shell;—seen dorsally, narrow oblong or lanceolate in outline, with the greatest width behind the middle and about equalling  $\frac{2}{5}$  of the length, anterior extremity gradually tapered, posterior more abruptly contracted. Surface of valves evenly convex and marked with faint longitudinal stripes connected by fine transverse lines, so as to form a somewhat reticulate pattern; inner duplicatures very broad, considerably reducing the extent of the central area of the valves, which is deeply emarginated behind and angularly bent in front. Anterior antennæ with the terminal joint only slightly shorter than the preceding joint. Posterior antennæ with the dividing suture of the penultimate joint located a little above the middle. Legs of 1st pair with 2 setæ on the infero-posteal corner of the basal joint, apical claw of this and the 2nd pair almost straight. Last pair of legs with the 1st joint of the terminal part much longer than the other 2 combined, apical claw much prolonged and abruptly incurved.

*Male* of smaller size than female, and having the shell, seen laterally, comparatively narrower, with the dorsal margin somewhat concaved; posterior part of the shell considerably swollen. Copulative appendages large, with the



basal part rounded quadrangular in shape and sending off at the junction with the terminal part a posteriorly-curving falciform piece, copulatory string narrowly convoluted at the base, with the extremity pointing backwards; terminal part provided at the base in front with a nose-shaped projection, distal part rather produced and narrowly rounded at the tip.

Colour of shell in its greater extent whitish, semipellucid, but marked in the centre by a very conspicuous sharply defined blackish patch of a saddle-like shape, extending down the sides of the valves.

Length of adult female 0.44 mm.

*Remarks.*—The present species is easily distinguished from the preceding ones by the almost quadrangular shape of the shell, and by the protuberance of the hind extremity being located distinctly above the longitudinal axis. When examined in the fresh state, it is moreover easily recognisable by the sharply defined dark saddle-like patch occupying the centre of each valve, a character which indeed has given rise to the specific name proposed.

*Occurrence.*—I have only met with this form in the upper part of the Christiania Fjord, where some few specimens were taken, many years ago, from a depth of 6—10 fathoms. Norman has however found it also in 2 localities on the western coast of Norway.

*Distribution.*—British Isles, Holland, Fosse de Cap Breton, Bay of Biscay.

*Fossil.*—Scotland.

## 102. *Cytherura atra*, G. O. Sars.

(Pl. XCV, fig. 2).

*Cytherura atra*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 75.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong subreniform in shape, equally high in front and behind, greatest height scarcely exceeding half the length, dorsal margin gently arched behind, more abruptly bent in front, with a slight indication to an angle in the ocular region, ventral margin slightly sinuated in the middle and terminating behind in a well-marked angular corner, anterior extremity obliquely rounded, posterior only slightly produced, the terminal protuberance being rather short and blunt, located in the longitudinal axis of the shell;—seen dorsally, oblong lanceolate in outline, with the greatest width behind the middle and somewhat exceeding  $\frac{1}{3}$  of the length, both extremities pointed, the posterior more abruptly contracted at the end than the anterior. Surface of valves evenly convex, exhibiting a faint reticulate pattern, edges smooth and very sparingly hairy. Anterior antennæ

with the terminal joint very small, not even attaining half the length of the preceding joint. Posterior antennæ with the dividing suture of penultimate joint occurring nearly in the middle.

*Male* unknown.

Colour uniformly dark blackish extending over the whole of the shell.

Length of adult female 0.59 mm.

*Remarks.*—In its general appearance this form bears some resemblance to the above-described species *C. similis*. It is however of rather larger size, and has the shell comparatively more elongate, with the infero-posteal corner distinctly angular. When observed in the living state, it is moreover at once distinguished by the uniform blackish colour of the shell, which character has indeed given rise to the specific name proposed.

*Occurrence.*—The only place where I have hitherto met with this species is at Skraaven, one of the Lofoten islands, where a few female specimens were taken in a depth of about 3 fathoms, sandy bottom.

*Distribution.*—Shetland.

*Fossil.*—Norway, Scotland.

### 103. *Cytherura intumescens*, G. O. Sars, n. sp.

(Pl. XCVI, fig. 1).

*Specific Characters.*—*Female.* Shell much inflated, seen laterally, oval subquadrangular in shape, equally high in front and behind, greatest height slightly exceeding half the length, dorsal margin nearly straight in the middle, and sloping behind with an even curve to the posterior protuberance, ventral margin slightly sinuated in the middle and rather strongly bowed behind, but without any trace of a projection or distinct angle, anterior extremity broadly and somewhat obtusely rounded, posterior produced to a well defined protuberance located distinctly above the longitudinal axis of the shell;—seen dorsally, very broad and somewhat lozenge-shaped, with the greatest width in front of the middle and considerably exceeding half the length, anterior extremity tapered to an obtuse point, posterior abruptly contracted to a conical prominence. Surface of valves evenly convex throughout and exhibiting a well-marked reticulate pattern. Anterior antennæ with the terminal part rather slender, 2nd joint the largest, last joint only slightly shorter than the preceding one. Posterior antennæ with the dividing suture of the penultimate joint occurring considerably above the middle.

*Male* of somewhat larger size than female and slightly differing in the shape of the shell, the posterior part of which is greatly swollen. Copulative appendages very large, with the basal part rounded quadrangular in shape and sending off below, at the junction with the terminal part, a slender posteriorly-curving piece slightly sigmoid at the end, copulatory string comparatively short; terminal part somewhat securiform in shape, being exerted at the posterior corner to a narrowly rounded lobule.

Colour of shell not yet ascertained.

Length of adult female 0.57 mm., of male 0.61 mm.

*Remarks.*—The male specimen figured by Brady & Norman in 1889 under the name of *C. cornuta* Brady seems to agree pretty well with the male of the present species, as here described. I think however that its identification with the form originally described by Brady under that name is wrong. In any case the specific name *cornuta* is quite unapplicable to the present species, as there is no trace of any corniform lateral projection, either in the female or in the male. The form recorded by Brady in his Monograph as *C. Gibba* O. Fr. Müller is unquestionably the female of the present species.

*Occurrence.*—Two specimens only (a male and a female) of this form have as yet come under my notice. They were found among some Ostracoda collected, some years ago, at Risør, south coast of Norway, from depths ranging from 10 to 30 fathoms.

*Distribution.*—British Isles.

#### 104. *Cytherura affinis*, G. O. Sars.

(Pl. XCVI, fig. 2).

*Cytherura affinis*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 77.

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally, oblong oval in shape, somewhat higher in front than behind, greatest height not nearly attaining half the length, dorsal margin forming a quite even and gentle curve throughout, without any indication of angle in the ocular region, ventral margin almost straight in the middle and gently bowed behind, anterior extremity broadly rounded, posterior produced to a rather prominent protuberance located slightly above the longitudinal axis of the shell;—seen dorsally, of a shape somewhat resembling that of the preceding species, but comparatively less broad, the greatest width scarcely exceeding half the length. Valves with the central thickened area considerably reduced in extent, surface conspicuously reticulated. Both pairs of antennæ very slender and narrow,



terminal part of the anterior ones with the 1st joint the longest, the last 2 joints subequal in length and combined about as long as the preceding joint. Posterior antennæ with the dividing suture of the penultimate joint located far above the middle. Mandibles very strong but with the palp rather poorly developed. Maxillæ with the palp and the masticatory lobes extremely narrow, the 2 innermost lobes confluent at the base.

*Male* unknown.

Colour not yet ascertained.

Length of adult female 0.62 mm.

*Remarks.*—This form was originally described by the present author from a single empty shell only, and of course solely the external characters could be determined at that time. More recently however a few complete specimens have come under my notice, whereby I have been enabled also to examine the limbs, which exhibit some well-marked particularities in their structure, as shown by the above diagnosis. It is one of the largest known species of the present genus.

*Occurrence.*—The specimen at first examined was found by my late father in shell-sand from Øxfjord, west Finmark, and another specimen was also obtained by him from postglacial deposits. The complete specimens subsequently found were taken off the west coast of Norway, the exact locality not being noted.

*Distribution.*—Not yet observed out of Norway.

*Fossil.*—Norway.

#### 105. *Cytherura striata*, G. O. Sars.

(Pl. XCVII, fig. 1).

*Cytherura striata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 74.

Syn: *Cytherura quadrata*, Norman.

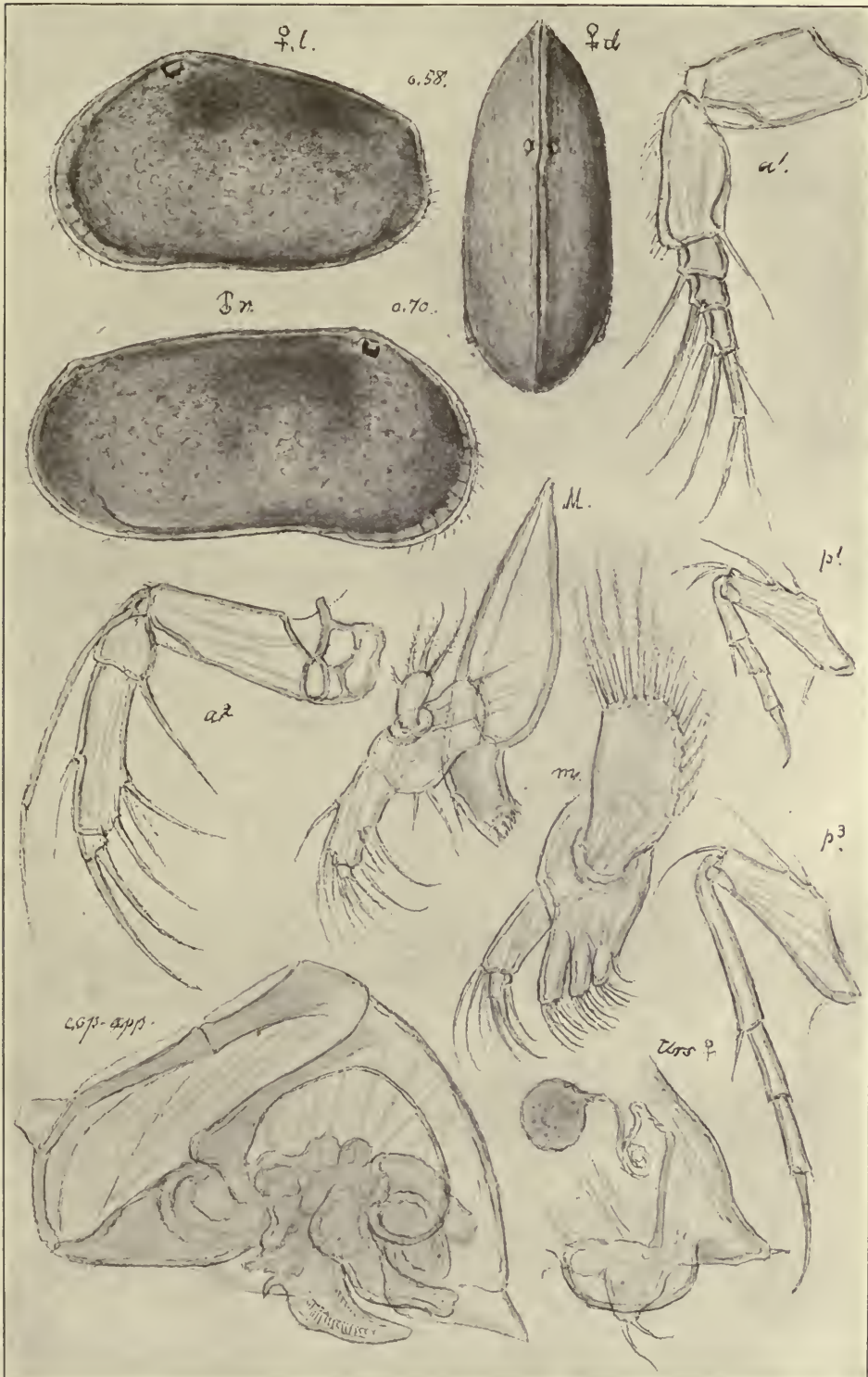
*Specific Characters.*—*Female.* Shell somewhat compressed, seen laterally, oblong subquadangular in shape, almost equally high in front and behind, greatest height nearly attaining half the length, dorsal margin straight and horizontal in the middle, sloping evenly in front, more steeply behind, ventral margin slightly sinuated in front of the middle and somewhat angular behind, anterior extremity obtusely rounded, posterior drawn out to a rather prominent protuberance located below the longitudinal axis of the shell;—seen dorsally, narrow oblong in outline, with the greatest width scarcely exceeding  $\frac{1}{3}$  of the length, side-edges nearly straight and parallel in the middle, anterior extremity

# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXI



G. O. Sars del.

*Cytheromorpha fuscata*, (Brady)



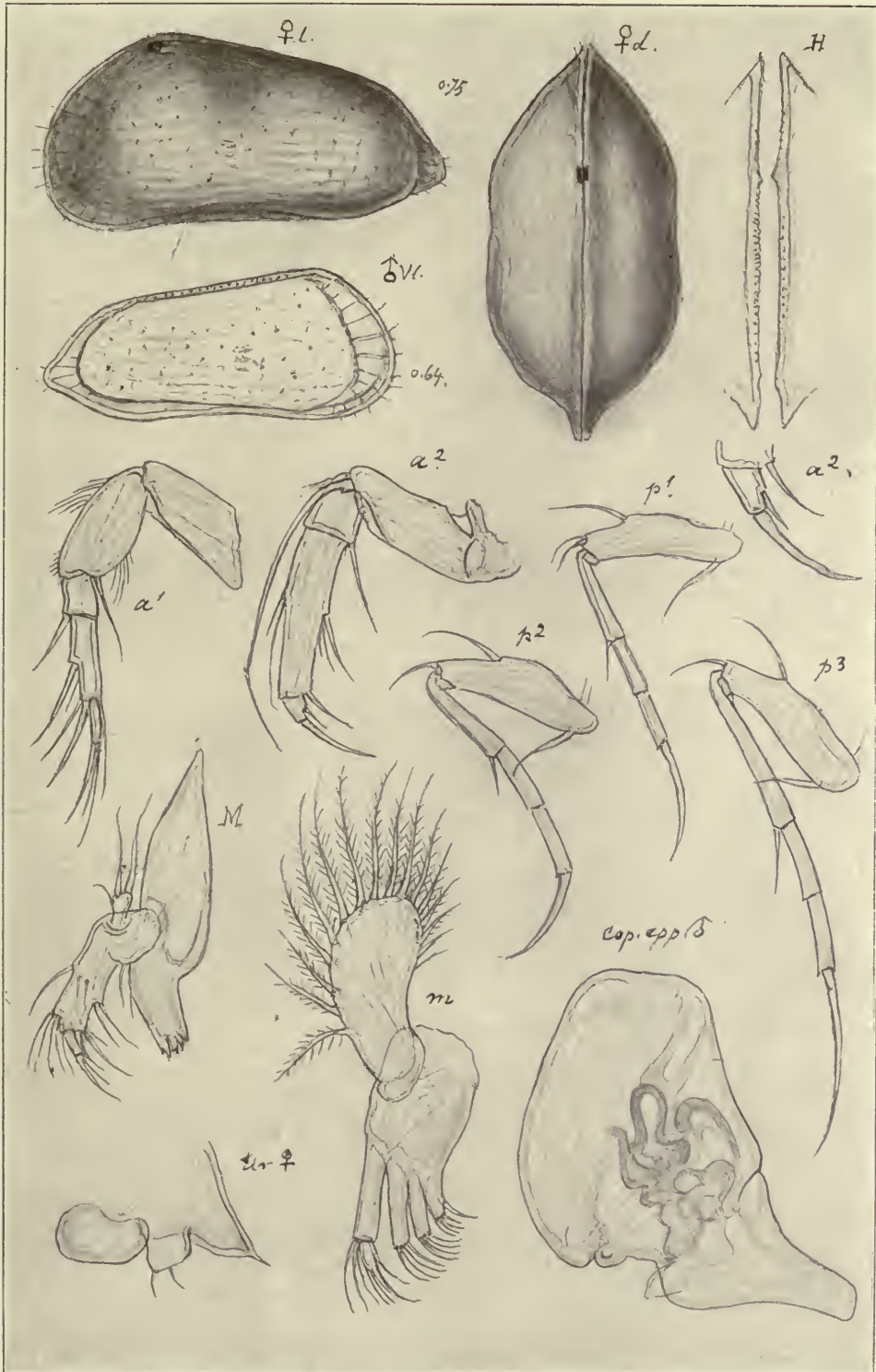


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXII



G. O. Sars del.

*Xenocythere cuneiformis*, (Brady)



# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXIII



G. O. Sars del.

*Kyphocythere limicola*, (Norman)



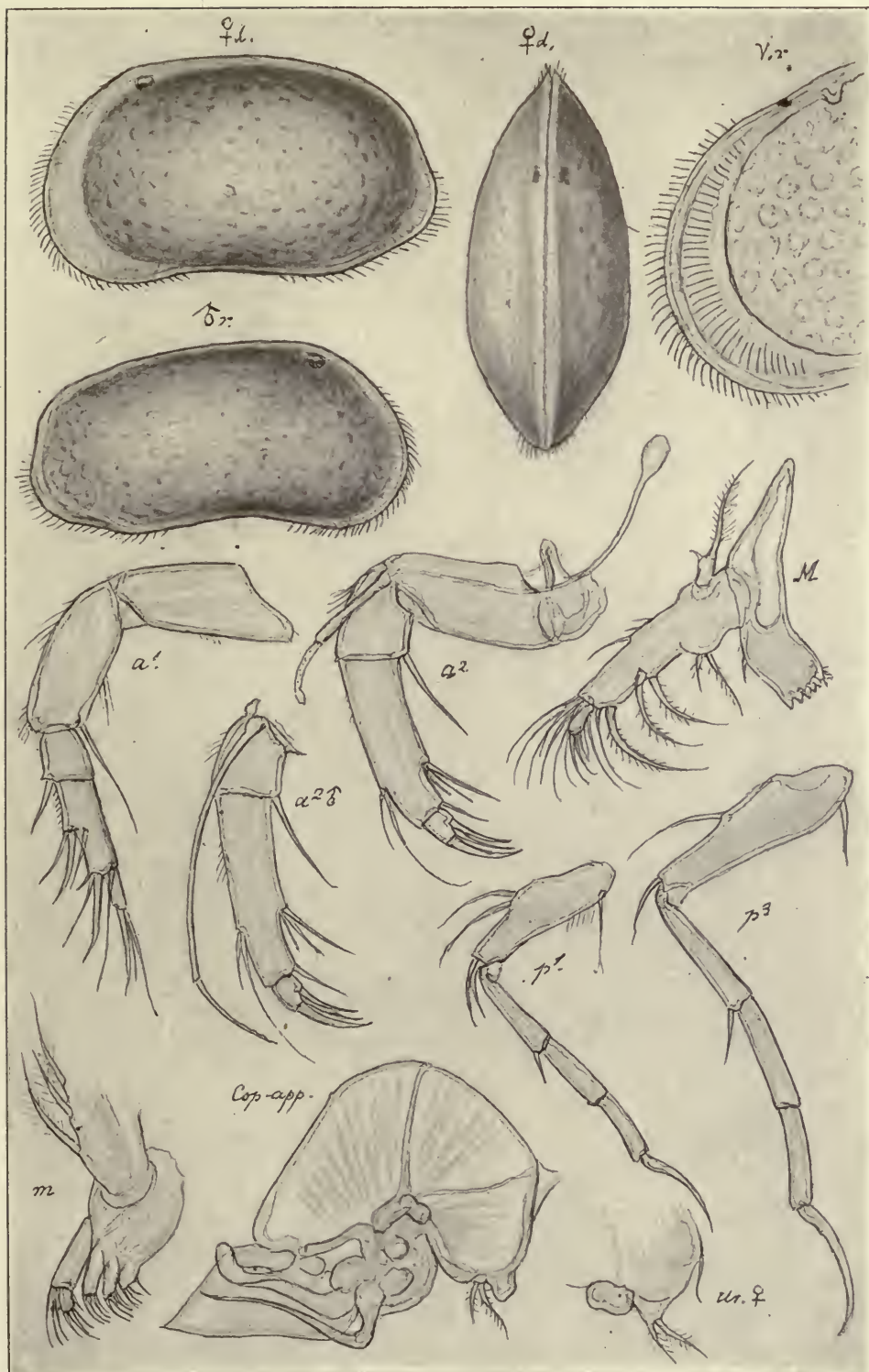


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXIV



G. O. Sars del.

*Hemicythere villosa*, G. O. Sars



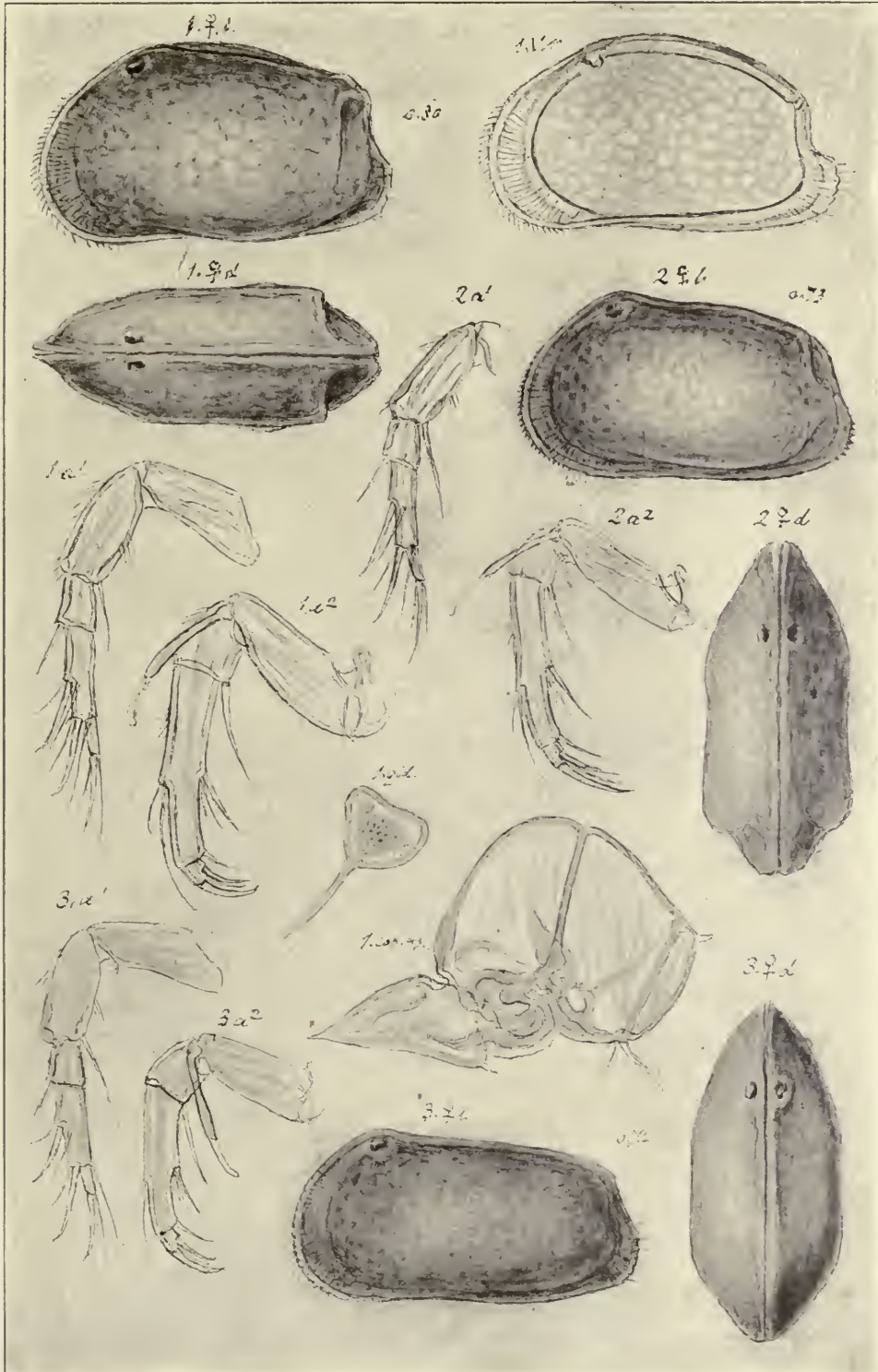


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXV



G. O. Sars del.

1. *Hemicythere emarginata*, G. O. Sars
2.     "      *crenulata*, G. O. Sars
3.     "      *finmarchica*, G. O. Sars

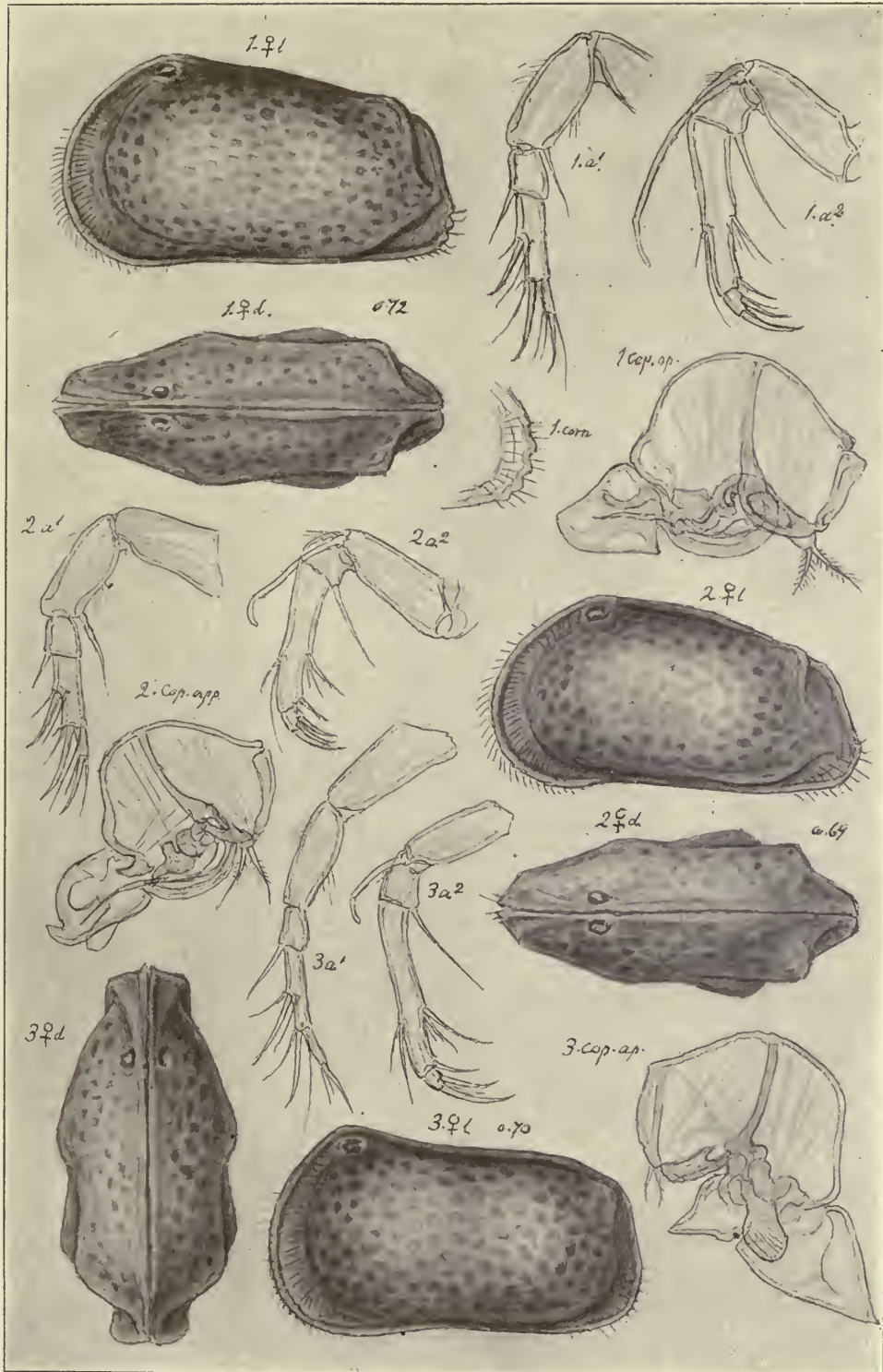


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXVI



G. O. Sars del.

1. *Hemicythere quadridentata*, (Baird)
2.     "     *angulata*, G. O. Sars
3.     "     *latimarginata* (Speyer)



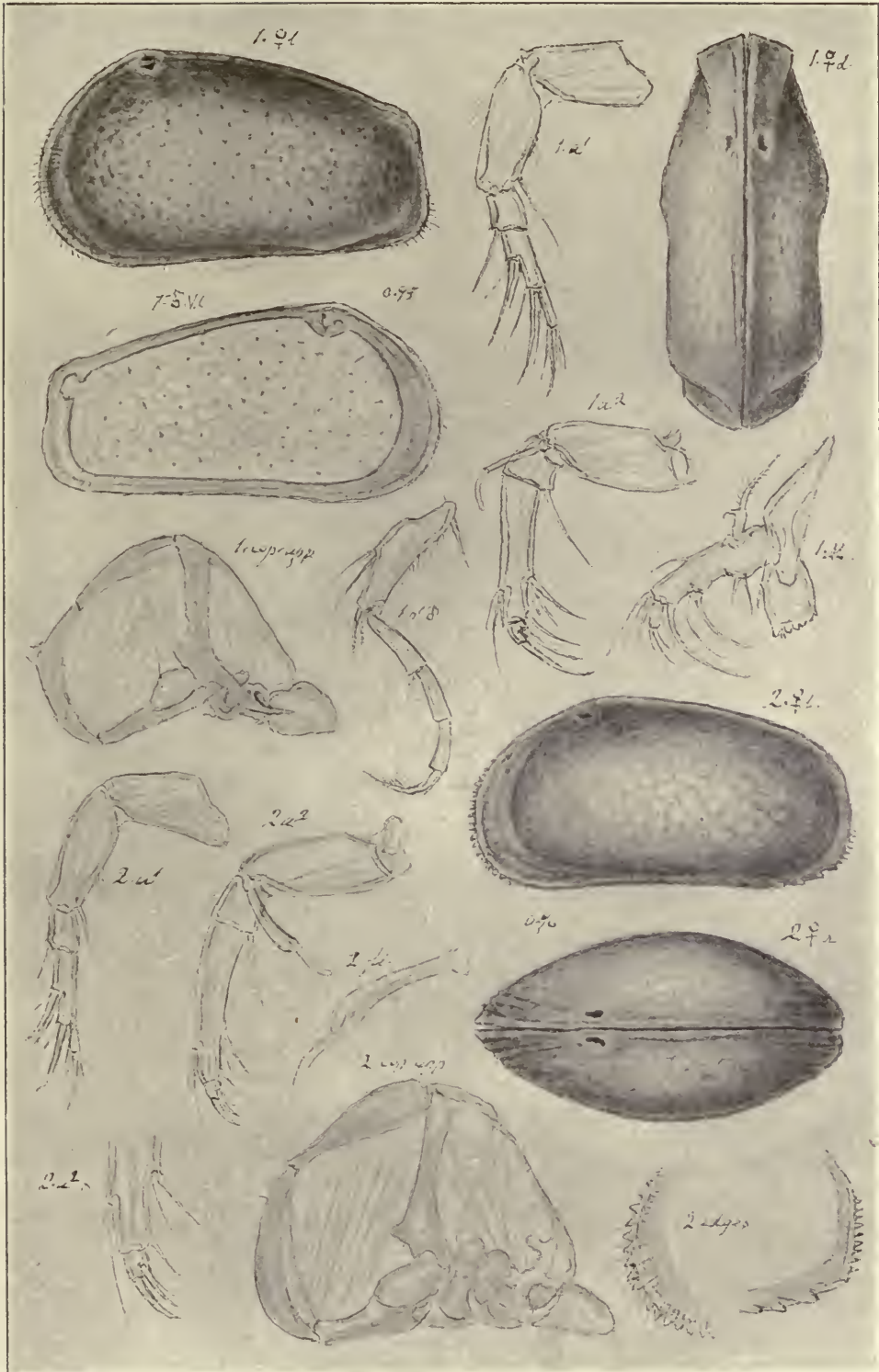


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXVII



G. O. Sars del.

1. *Hemicythere concinna*, (Jones)
2. " *oblonga*, (Brady)



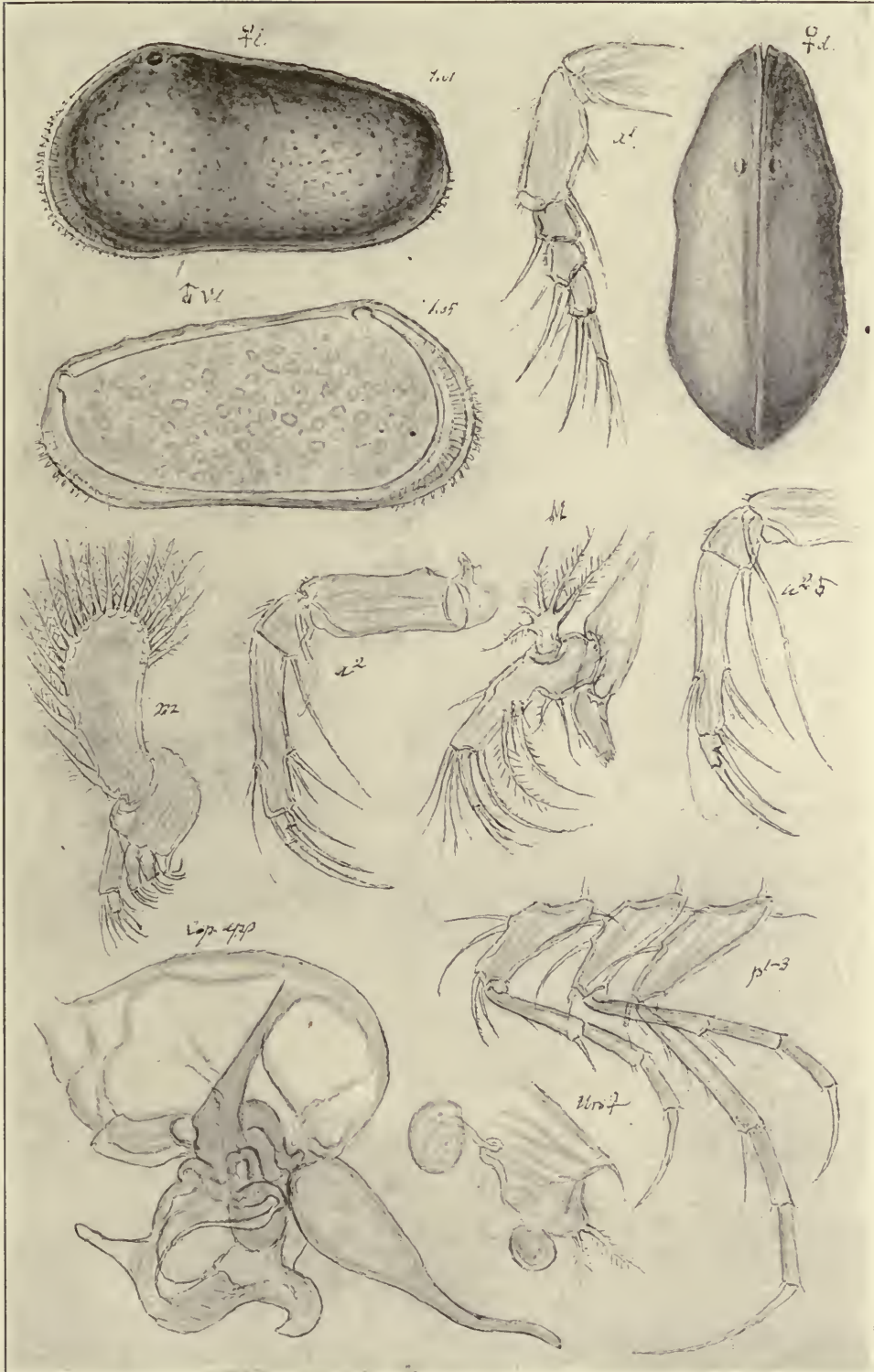


# Ostracoda

Cytheridæ

Podocopa

Pl. LXXXVIII



G. O. Sars del.

*Cythereis tuberculata*, G. O. Sars

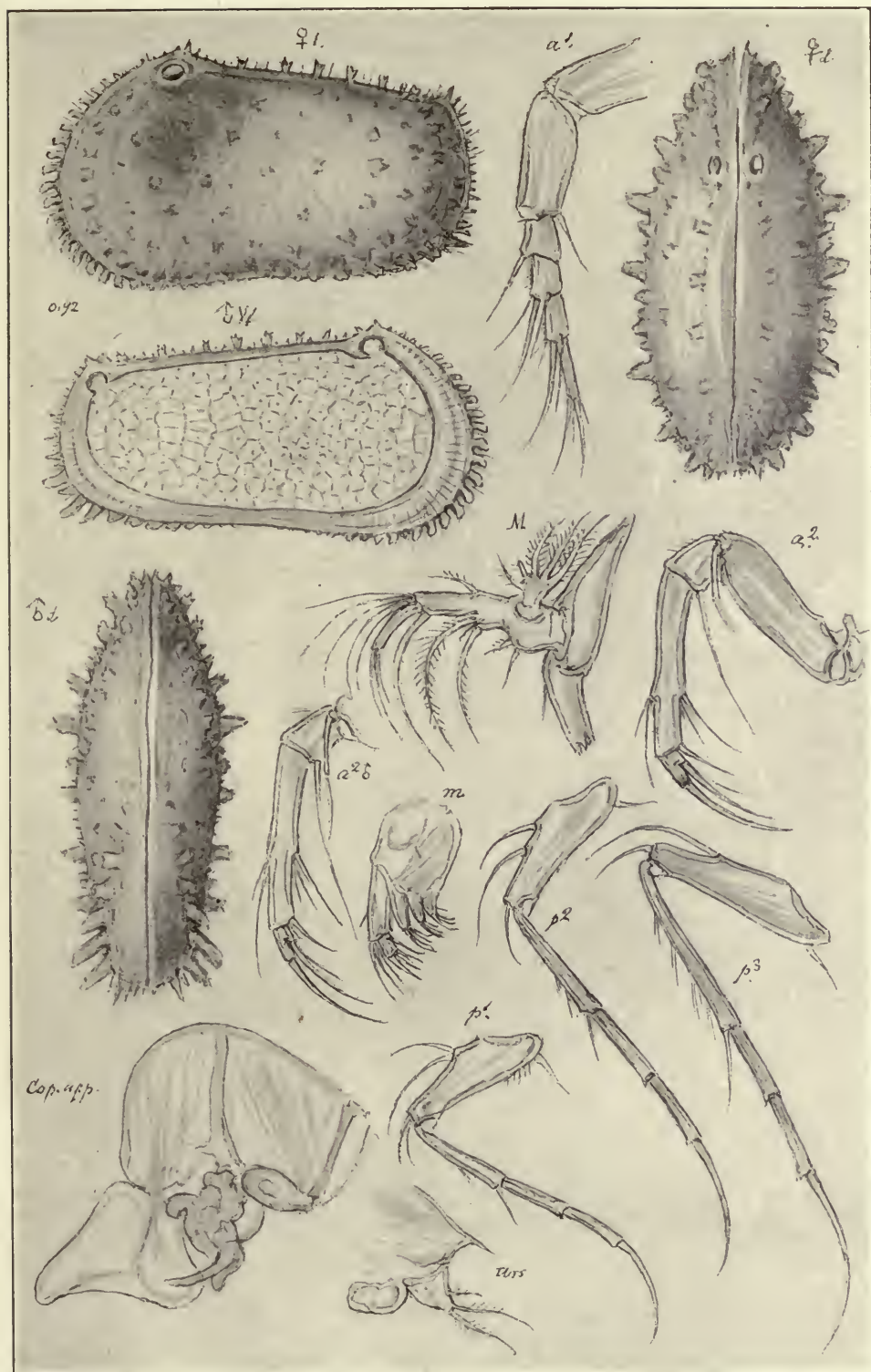


# Ostracoda

Cytheridæ

## Podocopa

Pl. LXXXIX



G. O. Sars del.

*Cythereis dunelmensis*, (Norman)



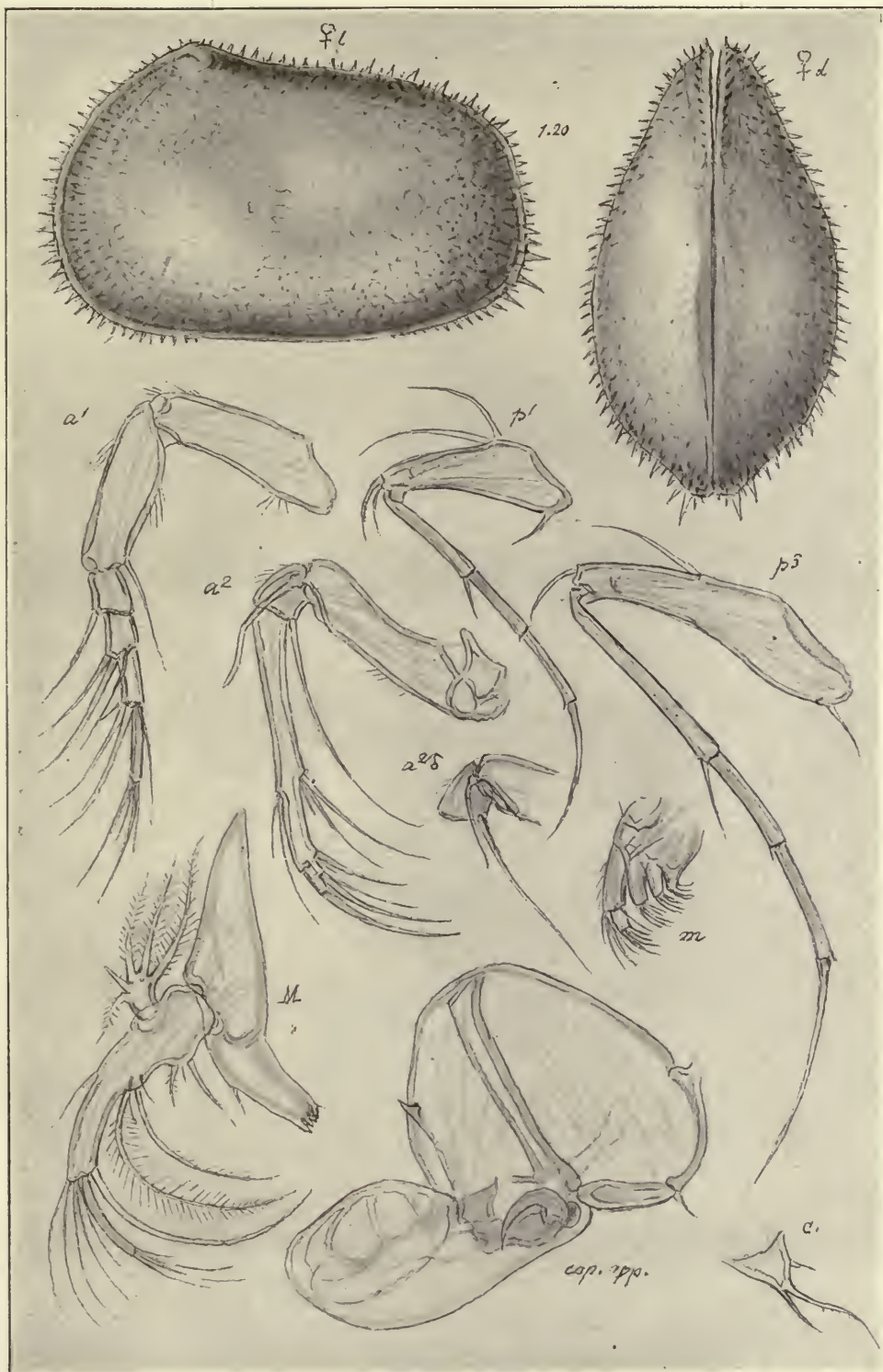


# Ostracoda

Cytheridæ

Podocopa

Pl. XC



G. O. Sars del.

*Cythereis echinata*, G. O. Sars





# Ostracoda

Cytheridæ

Podocopa

Pl. XCI



G. O. Sars del.

*Cythereis Jonesi*, (Baird)



# Ostracoda

Cytheridæ

## Podocopa

Pl. XCII



G. O. Sars del.

*Cythereis mucronata*, G. O. Sars



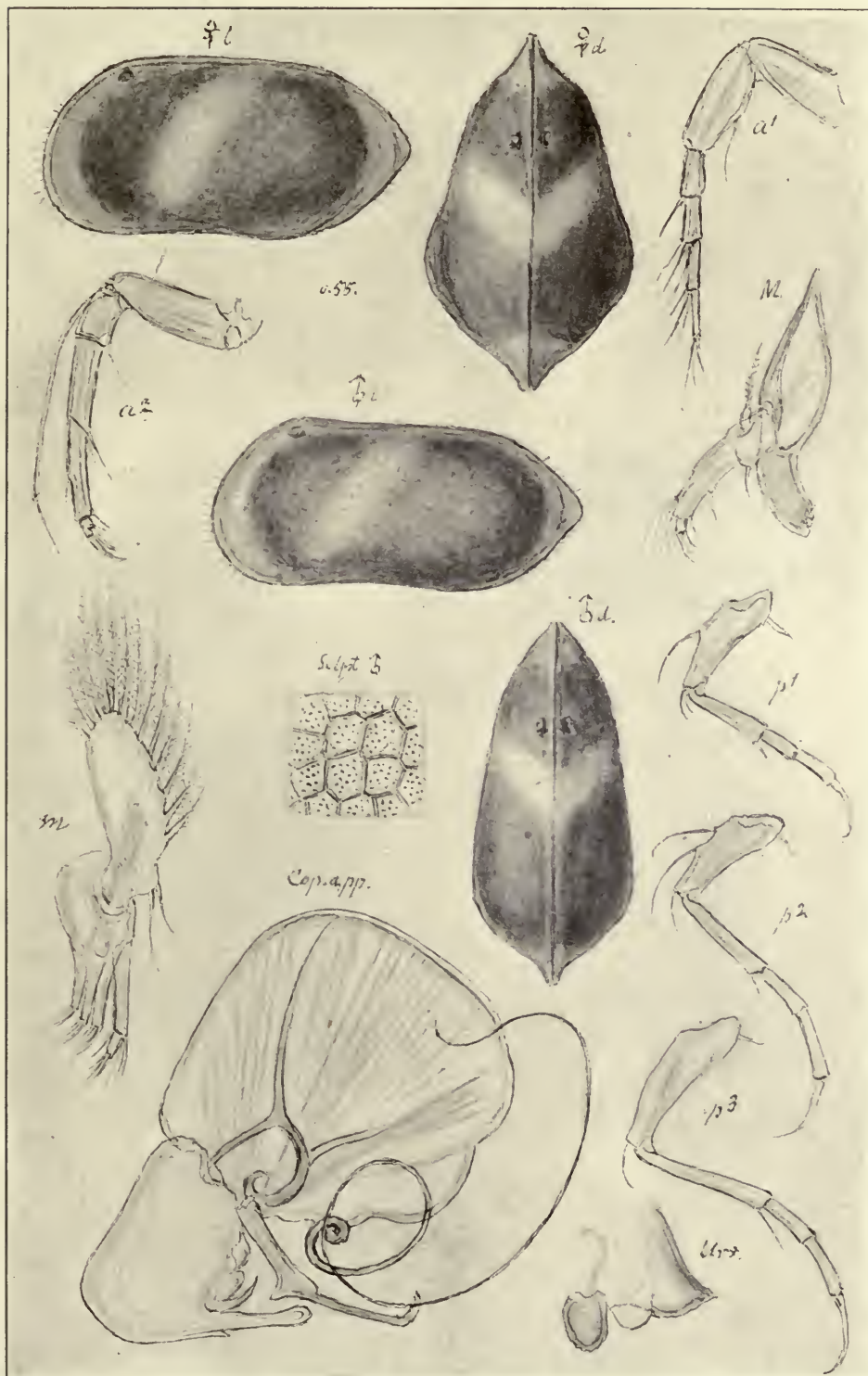


# Ostracoda

Cytheridæ

Podocopa

Pl. XCIII



G. O. Sars del.

*Cytherura gibba*, (O. Fr. Müller)



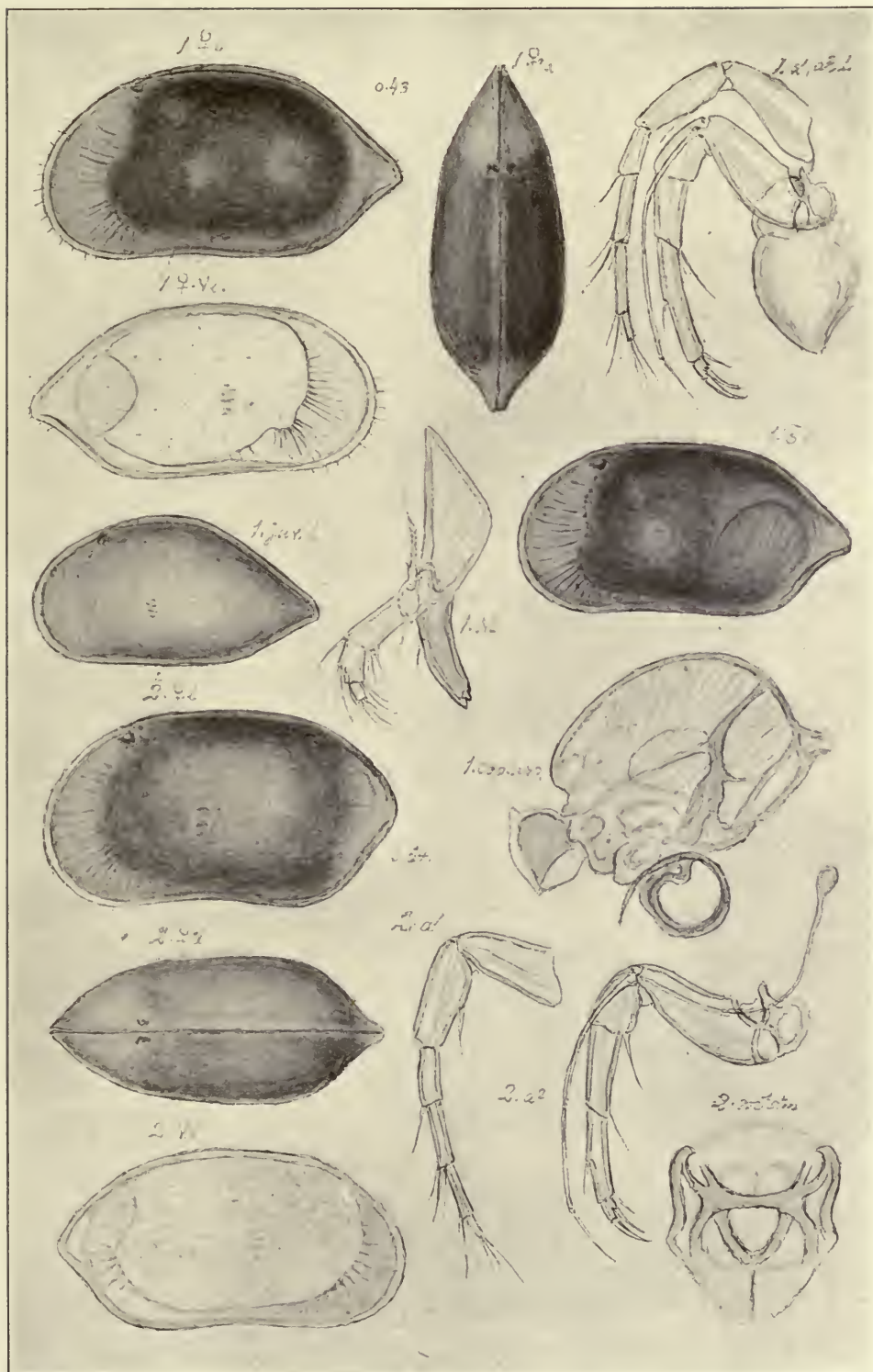


# Ostracoda

Cytheridæ

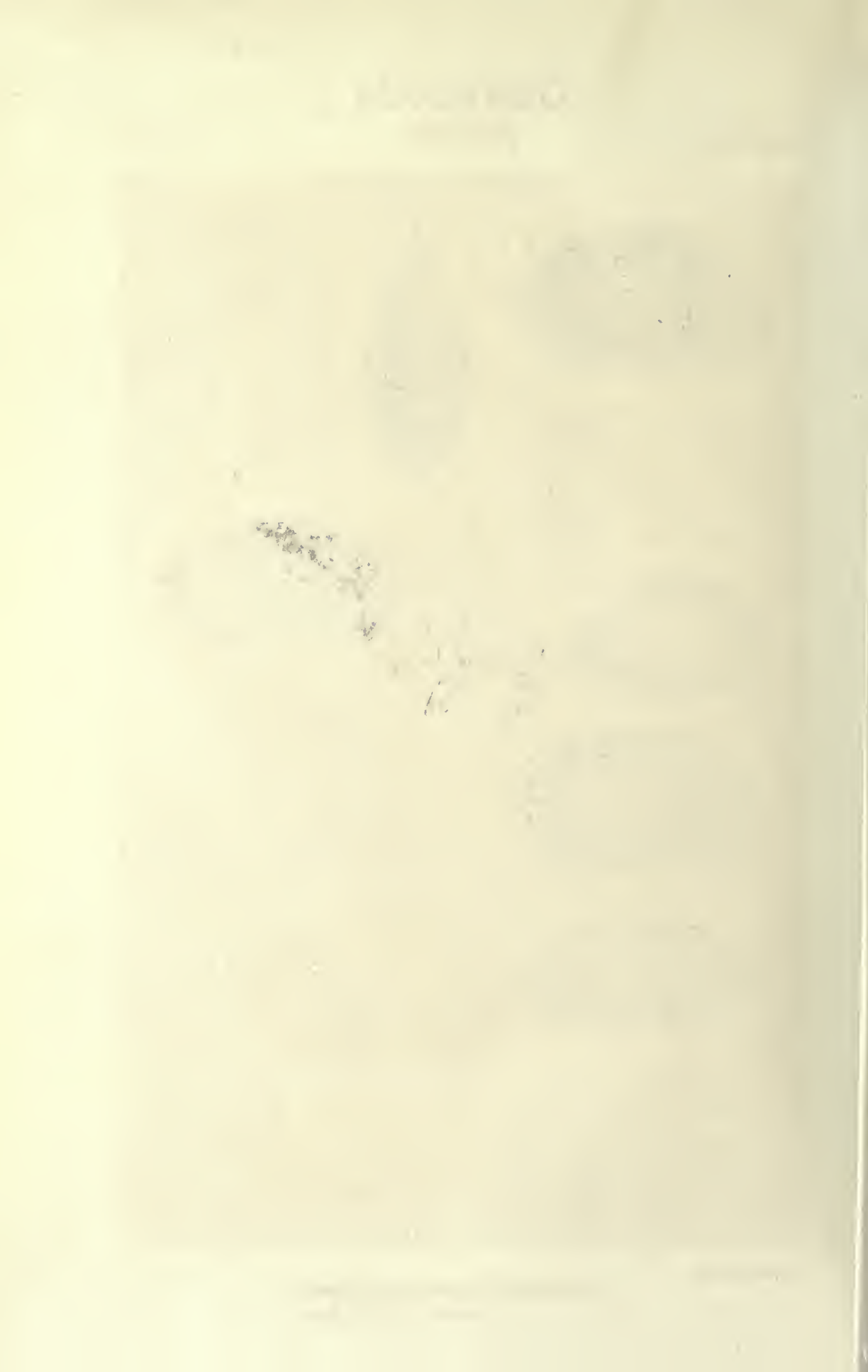
## Podocopa

Pl. XCIV



G. O. Sars del.

1. *Cytherura nigrescens*, (Baird)
2. „ *similis*, G. O. Sars

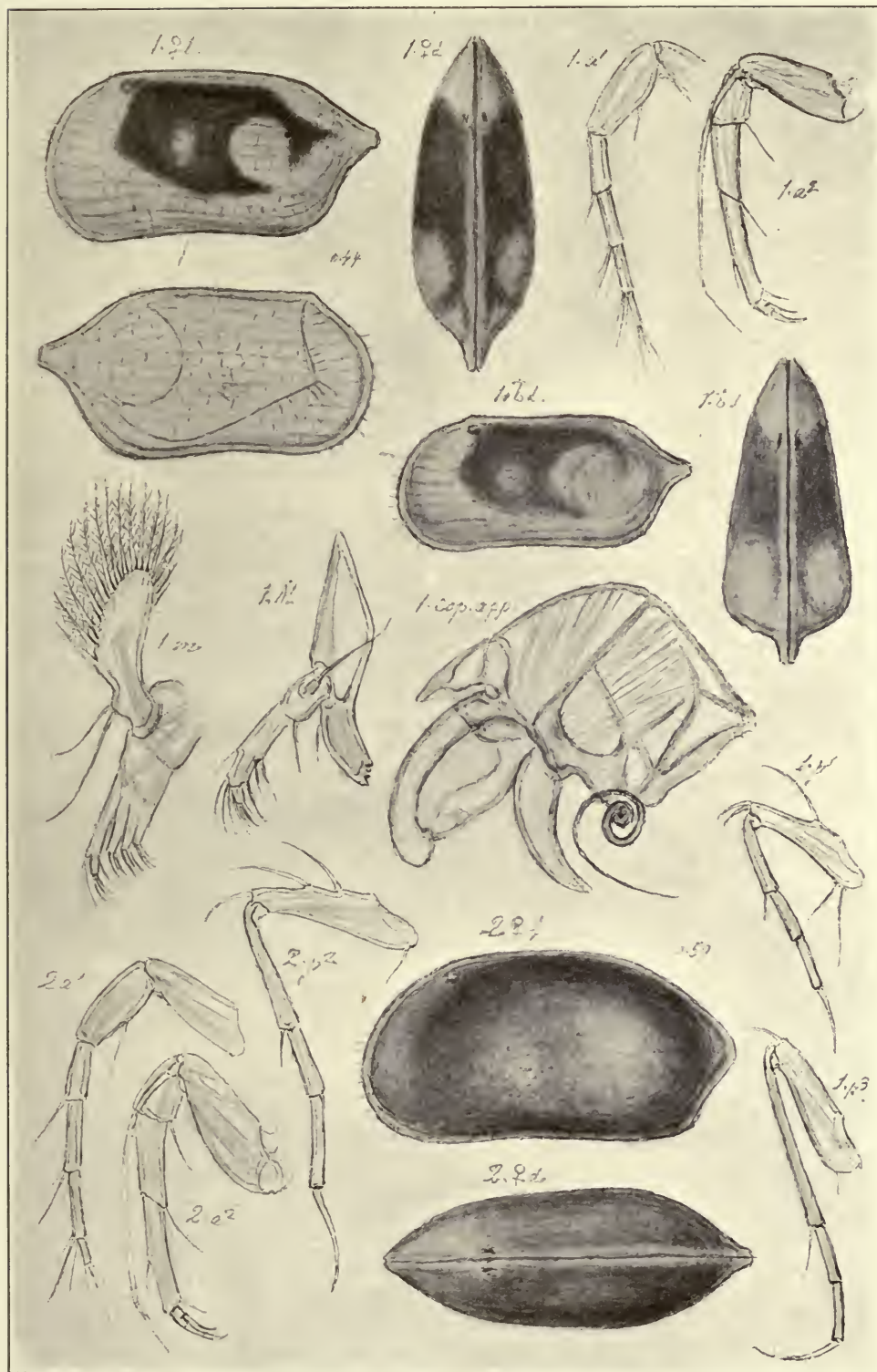


# Ostracoda

Cytheridæ

Podocopa

Pl. XCV



G. O. Sars del.

1. *Cytherura sella*, G. O. Sars
2. " *atra*, G. O. Sars



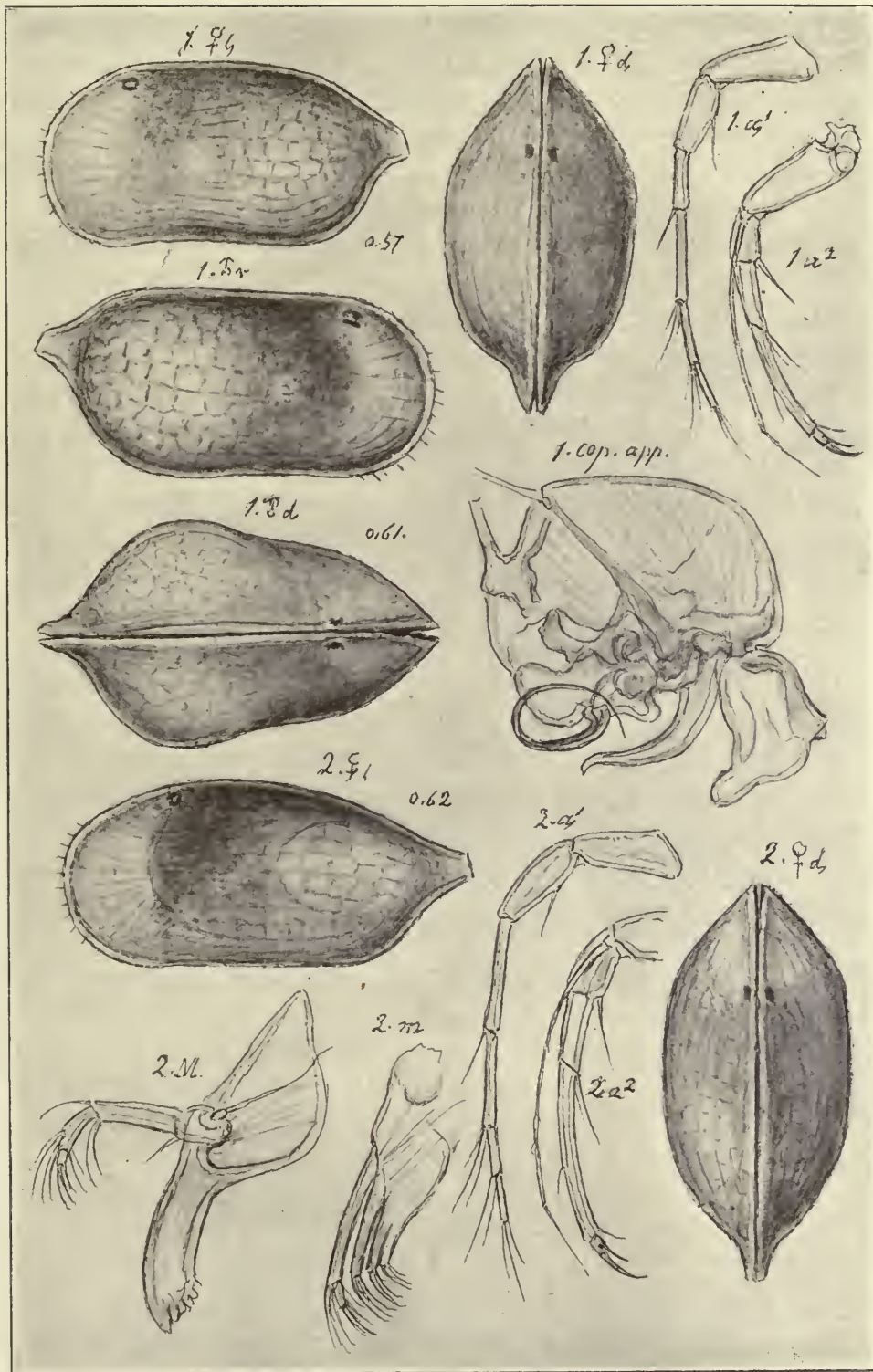


# Ostracoda

Cytheridæ

Podocopa

Pl. XCVI



G. O. Sars del.

1. *Cytherura intumescens*, G. O. Sars
2. „ *affinis*, G. O. Sars





pointed, posterior abruptly contracted to a narrow conical prominence. Valves of rather firm consistency and marked with distinct longitudinal striæ or folds partly connected with transverse lines, to form a somewhat irregular reticulation, exhibiting moreover a well-marked punctation of the shell. Anterior antennæ with the joints of the terminal part not much differing in size, the last being fully as long as the preceding one. Posterior antennæ with the dividing suture of the penultimate joint located a little above the middle. Legs rather slender, the last pair with the 1st joint of the terminal part somewhat exceeding in length the other 2 combined.

*Male* of about same size as the female, but having the shell conspicuously narrower, with the dorsal margin slightly concaved and the ventral more deeply sinuated. Copulative appendages with the basal part obliquely oval in shape and sending off below, at the junction with the terminal part, a slender recurved piece somewhat elbowed in the middle, and more posteriorly another much smaller deflexed process; copulatory string excessively prolonged, forming an ample turn and thence ascending to the very dorsal face; terminal part irregularly triangular in shape, projecting at the end anteriorly in a beak-like deflexed corner, behind which are 2 successive rounded lobules.

Colour of shell light orange, somewhat darker in front,

Length of adult female 0.49 mm.

*Remarks.*—The present species is easily recognised from those described in the preceding pages by the comparatively large size of the protuberance terminating the shell behind and by the situation of this protuberance below the longitudinal axis of the shell. The specific name alludes to another particularity, viz., to the rather strongly marked longitudinal striæ or folds adorning the surface of the valves. When examined in the fresh state it is also well distinguished by the light orange colour of the shell.

*Occurrence.*—I have taken this form occasionally in the upper part of the Christiania Fiord in depths of 10 to 20 fathoms, and have also met with it in several other places, both of the south and west coasts of Norway.

*Distribution.*—British Isles, Holland, Mediterranean.

*Fossil.*—Norway, Scotland.

#### 106. *Cytherura producta*, Brady.

(Pl. XCVII, fig. 2).

*Cytherura producta*, Brady, Mon. recent British Ostracoda, p. 443, Pl. XXXII, figs. 60, 61.

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally, narrow oblong oval in shape, somewhat higher in front than behind, greatest height

not nearly attaining half the length, dorsal margin evenly arched throughout, without any angular bend either in front or behind, ventral margin very slightly sinuated in front of the middle and only little bowed behind, anterior extremity somewhat irregularly rounded, being obtusely produced in the middle, posterior gradually narrowed to a very prominent protuberance located slightly below the longitudinal axis of the shell;—seen dorsally, broadly oval in outline, with the greatest width a little behind the middle and exceeding somewhat half the length, lateral faces flanked by an evenly curved pellucid border, both extremities conically produced at the end, the posterior somewhat more abruptly contracted than the anterior.—Valves rather thin and pellucid, each provided near the ventral face with an elevated thin longitudinal rib, very conspicuous in the dorsal or ventral aspects of the shell; surface perfectly smooth, without any obvious sculpture; central area of valves much reduced in extent. Anterior antennæ with the joints of the terminal part successively diminishing in size, the last very small, scarcely attaining half the length of the preceding joint. Posterior antennæ with the dividing suture of penultimate joint located nearly in the middle.

*Male* not observed.

Colour of shell not yet ascertained.

Length of adult female 0.50 mm.

*Remarks.*—The above-described form is easily recognisable by the greatly produced protuberance of the hind extremity, as also by the very conspicuous lateral crests. The shape of the shell differs also somewhat from that in the other species, both as seen laterally and dorsally.

*Occurrence.*—A few female specimens of this form were found among some Ostracoda collected at Korshavn, south coast of Norway, from depths ranging from 20 to 40 fathoms, muddy sand. Norman has also recorded the species from 2 localities on the west coast.

*Distribution.*—British Isles, Holland.

#### 107. *Cytherura acuticostata*, G. O. Sars.

(Pl. XCVIII, fig. 1).

*Cytherura acuticostata*, G. O. Sars, Oversigt over Norges marine Ostracoder, p. 76.

*Specific Characters.*—*Female.* Shell rather tumid, seen laterally, short subquadrangular in shape, equally high in front and behind, greatest height exceeding half the length, dorsal margin nearly straight in the middle and gently curved behind, joining the anterior edge without any obvious angle in

the ocular region, ventral margin very slightly sinuated and terminating behind in a somewhat projecting blunt corner, anterior extremity obtusely rounded and slightly bowed below, posterior produced above the middle to a well defined beak-like protuberance;—seen dorsally, broadly oval in outline, with the greatest width attaining  $\frac{2}{3}$  of the length, side-edges in their greater extent evenly curved, but distinctly angular behind, anterior extremity obtusely pointed, posterior abruptly contracted to a narrow conical prominence. Valves of rather firm consistency, with the surface very uneven, each valve being provided with 6—8 somewhat irregular and partly interrupted sharp longitudinal folds or ribs, 2 of which, located near the ventral face, are particularly strong and terminate behind in dentiform projections; a faint reticulation moreover present, especially visible in the posterior part of the shell. Anterior antennæ very slender, with the 2nd joint of the terminal part the longest, last joint a little shorter than the preceding one. Posterior antennæ with the dividing suture of the penultimate joint located rather above the middle. Legs comparatively slender, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

*Male* of nearly same size as female, but having the shell somewhat narrower, with the posterior extremity more obliquely truncated below. Copulative appendages with the basal part oval in shape and sending off below a knife-shaped recurved piece, copulatory string not much prolonged, but considerably thickened at the base; terminal part produced at the end to a beak-shaped projection and having the anterior edge bowed in the middle.

Colour of shell light brownish or violaceous.

Length of adult female 0.52 mm.

*Remarks.*—The present species is easily recognised from the other indigenous forms by the short and tumid shell and by the sharp longitudinal ribs adorning the valves and partly terminating behind in dentiform projections. Some of the forms recorded by G. W. Müller from the Gulf of Naples come very near to this species, though none of them are apparently strictly identical with the northern form.

*Occurrence.*—I have taken this form not unfrequently in several places of our south and west coasts, from the Christiania Fjord to Trondhjem, at depths ranging from 6 to 20 fathoms, sandy bottom.

*Distribution.*—British Isles, ? Mediterranean.

*Fossil.*—Norway, British Isles.



108. *Cytherura lineata*, Brady.

(Pl. XCVIII, fig. 2).

*Cytherura lineata*, Brady, Mon. rec. Brit. Ostracoda, p. 441, Pl. XXXII, figs. 30—34, 67.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong oval in shape, somewhat higher in front than behind, greatest height about equal to half the length, dorsal margin gently arched throughout and sloping quite evenly to the tip of the hind protuberance, ventral margin scarcely at all sinuated and only slightly bowed behind, anterior extremity broadly rounded, posterior produced to a well-marked protuberance somewhat obliquely truncated at the tip and located a little above the longitudinal axis of the shell;—seen dorsally, regularly oblong oval in outline, with the greatest width in the middle and equal to half the length, side-edges evenly bowed, both extremities pointed, the posterior somewhat more abruptly contracted than the anterior.—Valves rather thin and pellucid, surface marked with faint longitudinal striæ, which are connected by transverse lines, thus forming a very distinct reticulate pattern extending over the whole of the shell. There is however no trace of any punctuation, such as found in *C. striata*, its nearest ally. Both pairs of antennæ unusually short and stout, the anterior ones with the first 3 joints of the terminal part of uniform length, last joint somewhat shorter. Posterior antennæ with the dividing suture of penultimate joint located exactly in the middle.

*Male* not observed.

Colour of the shell not yet ascertained.

Length of adult female 0.45 mm.

*Remarks.*—I think I am right in identifying the above-described form with that originally recorded by Brady, as it on the whole agrees pretty well with the figures given in his Monograph. The author has however subsequently (in 1889) withdrawn this species, supposing it to be founded only on young specimens of his *C. cornuta*, a view which I am by no means prepared to assent. It seems to me to be a well defined species, nearest allied to the above described *C. striata*, from which it is however at once distinguished by the very different shape of the shell, as seen dorsally.

*Occurrence.*—A solitary female specimen only of this form has as yet come under my notice. It was found among some Ostracoda collected at Risør, south coast of Norway, from depths of 10—20 fathoms.

*Distribution.*—British Isles.

109. *Cytherura undata*, G. O. Sars.

(Pl. XCIX, fig. 1).

*Cytherura undata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 75.Syn: *Cytherura humilis*, Brady." — *pumila*, Norman.

*Specific Characters.—Female.* Shell somewhat compressed, seen laterally, oval subrhomboid in shape, a little higher in front than behind, greatest height exceeding somewhat half the length, dorsal margin quite evenly arched throughout, ventral margin nearly straight and terminating behind in an angular corner, anterior extremity rather obliquely rounded, posterior obliquely truncated below and forming about in the middle a very short and blunt protuberance;—seen dorsally, oblong oval in outline, with the greatest width not nearly attaining half the length, side-edges scarcely at all curved and somewhat waved, anterior extremity tapering to a blunt point, posterior abruptly contracted to a short conical prominence. Valves of rather firm consistency and very little pellucid, surface much uneven, exhibiting a peculiar undulate or wrinkled appearance, the wrinkles being only few in number and rather irregularly arranged, forming in the posterior part of the shell more or less elevated rounded protuberances. Anterior antennæ with the terminal part rather coarse, last joint however very small. Posterior antennæ with the dividing suture of penultimate joint located somewhat above the middle. Legs not much prolonged, last pair with the 1st joint of the terminal part shorter than the other 2 combined.

*Male* of rather smaller size than female and having the shell much narrower, with the dorsal margin quite straight in the middle. Copulative appendages with the basal part obliquely oval in shape and sending off below 2 unequal processes, the anterior one the larger and drawn out to a narrow slightly recurved lappet, copulatory string very coarse and curled up in a dense spiral; terminal part oblong quadrangular in form, being almost transversely truncated at the end.

Colour of shell opaquous bluish gray.

Length of adult female 0.52 mm.

*Remarks.*—This is an easily recognisable species, being in particular distinguished by the peculiarly undulated or wrinkled surface of the valves, to which character indeed the specific name proposed alludes.

*Occurrence.*—I have taken this form occasionally in several places on the Norwegian coast, from the Christiania Fjord up to the Lofoten islands. All the specimens were found in the laminarian zone on a sandy bottom.

*Distribution*.—British Isles, Holland, Spitzbergen, Dawis Strait, Gulf of St. Lawrence.

*Fossil*.—Norway, British Isles, Canada.

# 110. *Cytherura fulva*, Brady & Robertson.

(Pl. XCIX, fig. 1).

*Cytherura fulva*, Brady & Robertson, Ann. Mag. Nat. Hist., ser. IV, Vol. XIII, p. 116, Pl. IV, figs. 1—5.

*Specific Characters*.—*Female*. Shell very tumid, seen laterally, suboval in shape, equally high in front and behind, greatest height about half the length, dorsal margin nearly straight in the middle and evenly bent both in front and behind, ventral margin very slightly sinuated and gently bowed behind, anterior extremity well rounded, posterior produced in the middle to a rather short and blunt protuberance;—seen dorsally, broadly and regularly ovoid in outline, with the greatest width somewhat behind the middle and considerably exceeding half the length, side-edges quite evenly curved throughout, posterior extremity more sharply pointed than the anterior.—Valves nearly equal and rather opacous, surface evenly convex and marked with scattered rounded tubercles, exhibiting moreover a very delicate regular reticulation; inner duplicatures much narrower than in the other known species and quite simple, being evenly emarginated both in front and behind.—Anterior antennæ very slender, with the last joint of the terminal part much prolonged, being almost twice as long as the preceding joint. Posterior antennæ with the penultimate joint extremely narrow and wanting the usual dividing suture, the 2 lateral setiferous ledges quite opposite. Mandibles with the outermost outting tooth remarkably strong and prominent, the others short and blunt. Maxillæ with the distal joint of the palp unusually prolonged. Legs of moderate length, last pair with the 1st joint of the terminal part about as long as the other 2 combined.

*Male* of smaller size than female, but resembling it in the general shape of the shell. 1st pair of legs comparatively more strongly built than in female. Copulative appendages very large and compact, with numerous irregular chitinous thickenings partly projecting anteriorly, copulatory string of very delicate structure; terminal part not clearly defined from the basal one, and ending in a thin triangular lamella.

Colour of shell, according to Brady yellowish.

Length of adult female 0.50 mm.



*Remarks.*—This is a somewhat anomalous species, differing from the other known forms notably, both in the structure of the shell and in that of some of the appendages, though apparently referable to the present genus.

*Occurrence.*—Some few specimens of this remarkable form were obtained at Korshavn, south coast of Norway, from a depth of 20—30 fathoms, muddy sand.

*Distribution.*—British Isles, Holland, Fosse de Cape Breton, Bay of Biscay.

# 111. *Cytherura clathrata*, G. O. Sars.

(Pl. C, fig. 5).

*Cytherura clathrata*, G. O. Sars, Oversigt af Norges marine Ostracoder, pag. 77.

*Specific Characters.*—*Female.*—Shell somewhat compressed, seen laterally, rounded subtrigonal in shape, greatest height in the middle and almost attaining  $\frac{2}{3}$  of the length, dorsal margin boldly arched, and sloping rather steeply both in front and behind, ventral margin not at all sinuated, being distinctly convex throughout, anterior extremity rather oblique and narrowly rounded below, with the edge divided into 3—4 short and broad tooth-like projections, posterior extremity produced about in the middle to a comparatively short protuberance, well defined below by a distinct sinus;—seen dorsally, oblong oval or somewhat lanceolate in outline, with the greatest width behind the middle and about equal to half the length, anterior extremity gradually tapered to a sharp point, posterior abruptly contracted at the end, to form a narrow conical prominence.—Valves of rather firm consistency and remarkably unequal, the right one considerably overlapping the left along the dorsal face, and having the hind protuberance conspicuously narrower, each valve provided near the ventral face with a well-marked longitudinal crest appearing, in the dorsal aspect of the shell, as a thin border flanking the sides, posterior part of the shell with 2 superposed rounded protuberances on each side; surface roughly reticulated, the meshes being defined by distinctly elevated ribs, one of these ribs, running along the middle of each valve being particularly strong, inner duplicatures quite simple, emarginated both in front and behind.—Anterior antennæ comparatively slender, with the 2 middle joints of the terminal part nearly equal in length, last joint about half as long as the preceding one. Posterior antennæ much coarser, with a well marked oblique suture of the penultimate joint a little above the middle, apical claws more slender than in the other species. Legs of moderate length, last pair with the 1st joint of the terminal part about as long as the other 2 combined.

*Male* somewhat smaller than female, but scarcely differing from it in the general shape of the shell. Copulative appendages of comparatively small size and simple structure, basal part rounded quadrangular in shape, with only a few chitinous thickenings and a small pointed process below; terminal part abruptly recurved, having the form of a thin falcate lamella.

Colour of shell dark violaceous brown.

Length of adult female 0.62 mm.

*Remarks.*—The present form differs notably from those described in the preceding pages in the shape and structure of the shell, and should perhaps more properly be included in a particular genus together with the succeeding species to which it is evidently closely allied.

*Occurrence.*—I have only met with this form in a single locality, viz., in the Østnæs Fjord, at the Lofoten islands, where a few specimens were taken in a depth of 6—12 fathoms, sandy bottom.

*Distribution.*—British Isles, Arctic Sea; Spitzbergen, Baffins Bay.

*Fossil.*—Norway, British Isles.

## 112. *Cytherura cellulosa*, (Norman).

(Pl. C, fig. 2).

*Cythere cellulosa*, Norman. Nat. Hist. Trans. Northumb. & Durham, Vol. I, p. 22, Pl. V, figs. 17—20, Pl. VI, fig. 17.

Syn: *Cytherura nana*, G. O. Sars.

*Specific Characters.*—*Female.* Shell much compressed, seen laterally, oval subrhomboid in shape, greatest height in the middle and about equal to  $\frac{3}{5}$  of the length, dorsal margin well arched throughout, ventral nearly straight and terminating behind in a blunt corner, anterior extremity obliquely rounded, with the edge divided below into 5 blunt tooth-like projections, posterior extremity obliquely truncated below and produced somewhat above the middle to a blunt protuberance;—seen dorsally, narrow oblong in outline, the greatest width scarcely exceeding  $\frac{1}{3}$  of the length, side-edges straight and parallel in the middle, both extremities pointed, the posterior somewhat more abruptly contracted than the anterior.—Valves, as in the preceding species, very unequal and dissimilar in shape, surface however quite evenly convex, without any projecting ribs, but marked with a number of irregular rounded areolæ of of unequal size, each containing in the middle a little knob-shaped tubercle; inner duplicatures, as in the preceding species, simply emarginate.—Anterior antennæ somewhat less slender than in the said species, with the terminal joint rather

smaller. Posterior antennæ very like those in *C. clathrata*, but with the apical claws comparatively shorter. Legs likewise shorter; last pair with the 1st joint of the terminal part not attaining the length of the other 2 combined.

*Male* of smaller size than female and having the shell comparatively less high. Copulative appendages of almost exactly same structure as in the preceding species.

Colour of shell dark reddish brown, with the marginal parts lighter.

Length of adult female scarcely exceeding 0.35 mm.

*Remarks.*—The present species agrees in almost all the structural details closely with *C. clathrata*. It is however of very much smaller size, being in reality one of the smallest Ostracoda known, and differs moreover conspicuously in the sculpture of the shell.

*Occurrence.*—I have taken this form not infrequently in several places of the south and west coasts of Norway among algæ of the littoral zone. Owing to its extremely small size it may however easily escape to attention.

*Distribution.*—British Isles, Holland, Fosse de Cape Breton, Bay of Biscay, Mediterranean.

*Fossil.*—Norway, British Isles.

## Subfam. 5. Loxoconchinæ.

*Remarks.*—In this subfamily I propose to include the 2 genera *Loxoconcha* and *Cytheropteron*, which seem to me to present some characters in common, thus forming a natural group distinguishing itself from the other subfamilies here recorded. Both genera are well represented in the Fauna of Norway.

### Gen. 43. *Loxoconcha*, G. O. Sars, 1865.

Syn: *Normania*, Brady.

*Generic characters.*—Shell more or less pronouncedly rhomboid in shape, with the posterior part rather bowed and compressed below. Surface of valves evenly convex, without any traces of lateral expansions. Hinge with the closing teeth distinct, though rather small. Eyes well developed, in some cases confluent. Anterior antennæ with the terminal part, as a rule, composed of 4 joints clothed with scattered simple setæ, the last one rather prolonged. Posterior antennæ without any dividing suture of the penultimate joint, anterior setiferous



ledge of this joint placed at a higher level than the posterior, apical claws comparatively slender. Mandibles of normal structure, with the palp rather large but imperfectly jointed, vibratory plate well developed, being provided with 3 plumose setæ and a rudiment of a 4th. Maxillæ with the terminal joint of the palp rather prolonged, narrow cylindrical in shape, vibratory plate with only one of the setæ at the base deflexed. Legs comparatively slender, rapidly increasing in length posteriorly. Caudal lamellæ provided behind with a knob-like prominence carrying 2 divergent setæ. Copulative appendages of male with the terminal part somewhat imperfectly defined and more or less boot-shaped.

*Remarks.*—This genus is chiefly characterised by the short rhomboid shape of the shell, and by the want of any lateral expansions of the valves. In the structural details some well marked differences are found between this and the succeeding genus. It comprises several species both from the northern Ocean and from more southern latitudes. 4 species, belonging to the Fauna of Norway, will be described in the sequel.

### 113. *Loxoconcha impressa*, (Baird).

(Pl. C).

*Cythere impressa*, Baird, British Entomostraca, p. 175, pl. XXI, fig. 9.

Syn: *Cythere viridis*, Lilljeborg (not O. Fr. Müller).

" " *flavida*, Zencker.

" " *rhomboidea*, Fisher.

" " *elliptica*, Brady.

" *Loxoconcha rhomboidea*, G. O. Sars.

*Specific Characters.*—*Female.*—Shell rather tumid, seen laterally, short rhomboid in shape, greatest height in the middle and about equal to  $\frac{2}{3}$  of the length, dorsal margin boldly arched and sloping somewhat more steeply in front than behind, ventral margin slightly sinuated anteriorly and evenly bowed behind, anterior extremity obliquely rounded, posterior bluntly prominent above and oblique below;—seen dorsally, broadly fusiform in outline, with the greatest width in the middle and exceeding half the length, side-edges boldly curved, both extremities narrowly contracted and sharply pointed at the end.—Surface of valves marked with densely set small impressed pits, and moreover provided with a limited number of somewhat more conspicuous knob-like tubercles; inner duplicatures rather broad and crossed by distant fine pore-channels, edges thin and clothed with scattered delicate hairs. Eyes very conspicuous and widely apart. Anterior antennæ exceedingly slender, with the

2 middle joints of the terminal part imperfectly separated, last joint very narrow and prolonged, with the apical setæ unusually long and delicate. Posterior antennæ likewise comparatively slender, with the penultimate joint very narrow and having the anterior setiferous ledge placed near the base. Legs moderately prolonged, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

*Male* of somewhat larger size, than female and differing conspicuously in the shape of the shell, which is comparatively less tumid and, seen laterally, more oblique, with the dorsal margin nearly straight and angularly bent both in front and behind. Copulative appendages with the basal part oblong oval in shape and wanting any freely projecting string insides, terminal part produced in front to an obtuse point and almost rectangular behind.

Colour of shell light yellowish, with very conspicuous dark specks.

Length of adult female 0.64 mm., of male 0.68 mm.

*Remarks.*—The present form was recorded as early as the year 1850 by Baird as a species of *Cythere*. It was however not recognised by the subsequent authors, who described it under several other specific names, as seen from the above-given list of synonyms. Indeed, I cannot doubt, that both the form described by Lilljeborg as *Cythere viridis* and that recorded by Zencker as *C. flavida* are in reality identical with the present species. Brady and Norman have however referred these forms to a separate species named *Loxoconcha viridis*, and quote as a synonym *Loxoconcha elliptica* Brady. In my opinion the 3 said forms are quite undistinguishable from the above described species. Being that recorded at the earliest date, it ought of course to be regarded as the type of the present genus.

*Occurrence.*—This is one of our commonest Cytherids, being found rather abundantly along the whole of our coast in the littoral zone among algæ, on the leaf of which the animals are seen to climb with great dexterity by the aid of their slender posterior antennæ and legs.

*Distribution.*—British Isles, Kattegat, Baltic, coast of France, Mediterranean.

*Fossil.*—Norway, British Isles, Calabria.

#### 114. *Loxoconcha granulata*, G. O. Sars.

(Pl. CII, fig. 1).

*Loxoconcha granulata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p.

*Specific Characters.*—*Female.* Shell moderately tumid, seen laterally, more angular in shape than in the preceding species, greatest height a little behind the middle and scarcely attaining  $\frac{2}{3}$  of the length, dorsal margin nearly straight

and angularly bent both in front and behind, ventral margin slightly sinuated anteriorly and considerably bowed behind, anterior extremity obliquely rounded, posterior produced about in the middle to an obtuse prominence;—seen dorsally, oblong ovate or somewhat lanceolate in outline, with the greatest width behind the middle and scarcely exceeding half the length, anterior extremity gradually tapered to a sharp point, posterior abruptly contracted and conically produced at the end.—Surface of valves of a dull appearance, being marked with densely set small, but very distinct impressed pittings. Antennæ far less slender than in the preceding species, the anterior ones with the 2 middle joints of the terminal part distinctly defined, penultimate joint almost as long as the 2 preceding ones combined, last joint much narrower, but scarcely shorter, setæ on this part remarkably strong, almost spiniform. Posterior antennæ with the setiferous ledges of the penultimate joint located much farther down than in *L. impressa*. Legs very narrow and prolonged, last pair with the 1st joint of the terminal part much longer than the other 2 combined, and having the seta on the end considerably produced.

*Male* somewhat smaller than female, and having the shell less high, resembling in shape that in the female of the next species. Copulative appendages rather compact, subtriangular in shape, and provided inside with a distinct circularly curved string; terminal part not clearly defined from the basal one, and produced in front to a very thin somewhat upturned point.

Colour of shell uniformly dark fuscous.

Length of adult female 0.63 mm.

*Remarks.*—The present species is easily recognised by the rough granular surface of the valves, to which character indeed the specific name proposed alludes, and differs also conspicuously from the preceding species in the shape and colour of the shell. Moreover the structure of the antennæ is essentially different. The *Cythere guttata* of Norman is scarcely, as opined by Brady & Norman in 1889, identical with the present species, as the sculpture of the shell is apparently rather different.

*Occurrence.*—I have taken this form occasionally in several places of our coast, from the Christiania Fjord to Finmark, at depths ranging from 10 to 30 fathoms, muddy bottom.

*Distribution.*—British Isles.

*Fossil.*—Norway, Scotland.



115. *Loxoconcha tamarindus* (Jones).

(Pl. CII, fig. 2).

*Cythere tamarindus*, Jones, Tertiary Entomostraca, p. 49, Pl. III, figs 4, a—b.Syn: *Cythere lævata*, Norman.,, *Loxoconcha longipes*, G. O Sars.

*Specific Characters.*—*Female.* Shell somewhat compressed, seen laterally, obliquely oval in shape, greatest height only slightly exceeding half the length, dorsal margin nearly straight, somewhat bent in front and slightly angular behind, ventral margin a little sinuated in front and evenly bowed behind, anterior extremity obliquely rounded, posterior slightly prominent above the middle;—seen dorsally, narrow ovate in outline, with the greatest width behind the middle and about equal to  $\frac{2}{5}$  of the length, anterior extremity gradually tapered to a sharp point, posterior likewise pointed, but more abruptly contracted at the end.—Valves rather thin, with the surface quite smooth, being only marked with scattered small knobs. Anterior antennæ resembling in structure those in *L. granulata*, though the mutual length of the joints of the terminal part is somewhat different, the last joint being considerably longer than the preceding one, which does not attain the length of the first 2 joints combined. Posterior antennæ almost exactly as in the said species. Legs rather prolonged, though scarcely as narrow as in that species.

*Male* resembling the female in its general appearance, but of somewhat smaller size and having the shell comparatively narrower. Copulative appendages with the basal part oval in shape, and exhibiting inside a very distinct freely projecting string curved in a circle and bent downwards; terminal part comparatively large and rather prominent in front, ending in a very sharp point, being well defined at the base anteriorly, but behind confluent with the basal part.

Colour of shell light reddish brown, with the marginal parts lighter.

Length of adult female 0.60 mm.

*Remarks.*—This form was recorded as early as the year 1856 by Jones from fossil shells, and was subsequently observed in the living state by the present author, who described it under the name of *Loxoconcha longipes*. It is easily recognised from the 2 preceding species by the much narrower shape of the shell, as also by its colour.

*Occurrence.*—I have met with this form occasionally in several places on our coast, from the Christiania Fjord to Lofoten, in depths ranging from 10 to 30 fathoms.

*Distribution.*—British Isles, Iceland, Cap Breton, Mediterranean.

*Fossil.*—Norway, British Isles, Calabria.

116. *Loxoconcha fragilis*, G. O. Sars.

(Pl. CII, fig. 3).

*Loxoconcha fragilis*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 65.

*Specific Characters.*—*Female.* Shell much compressed, seen laterally, oval subrhomboid in shape, greatest height considerably exceeding half the length, dorsal margin somewhat bowed in the ocular region, but sloping otherwise with a quite even and gentle curve until the tip of the hind prominence, ventral margin slightly sinuated in front and rather bowed behind, anterior extremity well rounded, posterior produced above to a blunt prominence and evenly rounded off below;—seen dorsally, narrow oblong in outline, with the greatest width in the middle and scarcely exceeding  $\frac{1}{3}$  of the length, both extremities evenly contracted and sharply pointed at the end.—Valves very thin and pellucid, with the posterior part much compressed below, surface perfectly smooth and polished, without any obvious sculpture, inner duplicatures remarkably broad posteriorly, marginal zone well defined and crossed by very distinctly marked pore-channels. Eyes confluent. Anterior antennæ very slender, with all the joints of the terminal part well defined, the last about half the length of the preceding one. Legs likewise comparatively slender and prolonged, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

*Male*, as usual, smaller than female, with the shell comparatively narrower. Copulative appendages rather compact and sending off below 2 or 3 irregular processes, but without any distinctly defined string insides; terminal part very small and not clearly defined from the basal one, projecting in front to an obtuse lobule.

Colour of shell whitish pellucid, with a dark patch behind the ocular region curving somewhat upwards at the end.

Length of adult female 0.49 mm.

*Remarks.*—This is a somewhat aberrant species, differing rather conspicuously from the other known members of the present genus in the very thin and fragil shell and in the wholly coalescence of the eyes. The form recorded by G. W. Müller from the Gulf of Naples under the name of *L. pellucida* seems to be nearly allied to the present species, though apparently distinct.

*Occurrence.*—Although nowhere occurring in any abundance, this form has been taken in several places of the Norwegian coast, from the Christiania Fjord to Lofoten, in the sublittoral region among algæ.

*Distribution.*—British Isles.

*Fossil.*—Scotland.

Gen. 44. **Cytheropteron**, G. O. Sars, 1865.

*Generic Characters.*—Shell of somewhat varying shape, generally thin and pellucid, with no sharply marked sculpture. Valves slightly unequal, each provided with a well defined, more or less prominent alæform lateral expansion occurring near the ventral face. Hinge imperfectly developed. Eyes wholly absent. Anterior antennæ with the terminal part, as a rule, only composed of 3 joints clothed with scattered simple setæ, last joint very small. Posterior antennæ with a well marked dividing suture of the penultimate joint, and with the anterior setiferous ledge of this joint located far below. Mandibles strongly dentate at the end, palp of moderate size, but with the vibratory plate considerably reduced, being only provided with a single seta. Maxillæ with the masticatory lobes rather produced, palp very narrow, with the distal joint small, vibratory plate, as in *Cytherura*, provided at the base with 2 thin abruptly deflexed setæ issuing from a well defined lobule. Legs more or less slender and prolonged. Posterior end of body drawn out to a much prolonged conical point. Caudal lamellæ short, with 3 small bristles, one apical and 2 lateral. Copulative appendages of male without any freely projecting string insides, but provided below with 3 peculiar corniform processes, the foremost more or less ramified at the end; terminal part simple, lamellar.

*Remarks.*—The present genus is chiefly characterised by the peculiar alæform lateral expansions of the valves, to which indeed the generic name proposed alludes. It differs moreover from the preceding genus in the wholly absence of eyes, as also somewhat in the structure of the antennæ. G. W. Müller considers it to be nearly allied to *Cytherura*, but I think that its relationship to *Loxoconcha* is rather closer. Several species of this genus have been recorded, all of them being true deep-water forms. In the following pages 10 species will be described as members of the Norwegian Fauna.

117. **Cytheropteron latissimum**, (Norman).

(Pl. CIII).

*Cythere latissima*, Norman, Nat. Hist. Trans. Northumb. & Durham, Vol. I, p. 19, Pl. VI, figs. 5–8.

Syn: *Cytheropteron convexum*, G. O. Sars.

*Specific Characters.*—*Female.* Shell very tumid, but with the alæform expansions only slightly prominent, seen laterally, oval subtriangular in shape, somewhat higher in front than behind, greatest height about equal to  $\frac{3}{5}$  of



the length, dorsal margin rather bowed in the ocular region, but sloping evenly behind, ventral margin slightly sinuated in front of the middle, anterior extremity obliquely rounded and somewhat bowed below, posterior produced in the middle to an obtuse prominence not clearly defined below;—seen dorsally, broadly ovate in outline, with the greatest width behind the middle and about equal to the height, side-edges irregularly bent posteriorly, anterior extremity evenly tapered, posterior somewhat abruptly contracted at the end to a conical prominence. Valves with the alæform expansions well marked, but not much prominent, terminating behind in an obtuse angle, surface marked with slight pittings arranged in more or less vertical rows. Antennæ moderately slender, the anterior ones with the penultimate joint about twice as long as the preceding one. Legs gradually increasing in length posteriorly, last pair with the 1st joint of the terminal part considerably longer than the other 2 combined.

*Male* a little smaller than female, but only slightly differing in the shape of the shell. Copulative appendages of moderate size, with the basal part rounded triangular in shape, foremost corniform proces tripartite at the extremity; terminal part rather narrow and transversely truncated at the end.

Colour of shell whitish gray, semipellucid.

Length of adult female 0.65 mm.

*Remarks.*—This form was recorded in the year 1865 by Norman as a species of *Cythere*, and was in the same year observed by the present author, but erroneously identified with *Cythere convexa* Baird, which is a true member of the genus *Hemicythere*, as defined above. In the general outward appearance it is not unlike some of the species of the genus *Loxoconcha*, and may easily, at the first sight, be mistaken as such. On a closer examination it is however found to differ essentially in the absolute want of eyes and in the presence of distinct, though rather small alæform lateral expansions of the valves. The structure of the limbs and of the copulative appendages in the male moreover proves it to be a genuine membre of the present genus.

*Occurrence.*—I have taken this form not unfrequently in the upper part of the Christiania Fjord, as also in several other places on our coast up to Finmark, at depths ranging from 10 to 30 fathoms muddy bottom.

*Distribution.*—British Isles, Holland, Iceland, Spitzbergen, Baffins Bay.

*Fossil.*—Norway, Scotland, Canada.

118. *Cytheropteron alatum*, G. O. Sars.

(Pl. CIV, fig. 1).

*Cytheropteron alatum*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 81.

*Specific Characters.*—*Female.* Shell exhibiting a very peculiar appearance on account of the excessive development of the alæform expansions, seen laterally, narrow oblong in shape, greatest height in the middle and scarcely exceeding half the length, dorsal margin gently arched throughout, ventral very slightly sinuated, anterior extremity obtusely rounded off, posterior produced in the middle to a well-defined protuberance somewhat obliquely truncated at the end;—seen dorsally, very broad, square-shaped, with the width between the tips of the alæform expansions fully attaining the length, both extremities narrowly produced.—Valves thin and pellucid, without any obvious sculpture, alæform expansions remarkably large and prominent, extending somewhat downwards, and triangular in shape, each exerted at the end to a sharp spiniform process, posterior edge of the expansion provided with a row of peculiar appendages, the 2 proximal ones somewhat remote from the others and lamelliform, being divided at the end into fine points; inner duplicatures of the valves rather broad and crossed by scattered fine pore-channels.—Antennæ of a structure very similar to that in the preceding species. Legs extremely slender and narrow, with the apical claw much prolonged. Posterior end of body produced in a remarkably long conical process.

*Male* of rather smaller size than female, but resembling it in the general shape of the shell. Copulative appendages built on the same type as in *C. latissimum*, but with the basal part comparatively smaller and the corniform processes somewhat differing in shape; terminal part rather large, subtriangular.

Colour of shell whitish pellucid.

Length of adult female 0.70 mm.

*Remarks.*—The present form is at once recognised from any of the other known species by the enormous development of the alæform expansions of the valves, giving the animal a quite particular appearance, and rendering it rather difficult to get a lateral view of the shell.

*Occurrence.*—The species was first observed in the upper part of the Christiania Fjord, where a few specimens were taken in a depth of about 30 fathoms, and I have subsequently met with it occasionally also in some other places on the south coast of Norway (Risør, Korshavn) at about the same depth.

*Distribution.*—British Isles, Shetland.

119. *Cytheropteron hamatum*, G. O. Sars.

(Pl. CIV, fig. 2).

*Cytheropteron hamatum*, G. O. Sars, Chr. Vid. Selsk. Forhandl. 1869, p. 172.

*Specific Characters.—Female.* Shell much shorter and stouter than in the preceding species, with the alæform expansions far less developed, seen laterally, irregularly oval in shape, greatest height in the middle and about equal to  $\frac{3}{5}$  of the length, dorsal margin considerably arched, ventral slightly sinuated in front and evenly convex behind, anterior extremity rather obliquely rounded, posterior produced in the middle to a well defined protuberance, narrowly truncated at the end;—seen dorsally, somewhat lozenge-shaped, with the greatest width (between the tips of the alæform expansions) not nearly attaining the length, both extremities sharply pointed, the posterior more abruptly contracted than the anterior.—Valves somewhat coarser than in the preceding species, with the alæform expansions short rectangular in shape and issuing rather behind the middle, each produced at the end to a sharp spiniform process more or less distinctly curved forwards in a hamiform manner; surface marked with slight pittings arranged partly in concentric rows. Antennæ comparatively less slender than in *C. alatum*, but of a very similar structure. Legs likewise less narrow and prolonged than in that species.

*Male* resembling the female in the shape of the shell, but of somewhat smaller size. Copulative appendages rather like those in the preceding species, differing however somewhat in the shape of the corniform processes, as also in that of the terminal part, which is narrowly rounded at the end.

Colour of shell whitish grey.

Length of adult female 0.62 mm.

*Remarks.*—Though rather closely allied to *C. alatum*, this species is at once distinguished by the more compact appearance of the shell and by the far less prominent alæform expansions, which do not exhibit any appendages posteriorly and have the terminal spine somewhat hamiform curved, hence the specific name proposed.

*Occurrence.*—The only locality where I have as yet met with this species, is at Skraaven, one of the Lofoten islands. It was found here occasionally at the considerable depth of 120–300 fathoms, muddy bottom. Norman has however taken it at Stoksund, west coast of Norway.

*Distribution.*—Spitzbergen, Dawis Strait.

*Fossil.*—Scotland.



120. *Cytheropteron punctatum*, Brady.

(Pl. CV, fig. 1).

*Cytheropteron punctatum*, Brady, Mon. Brit. rec. Ostracoda, p. 449, Pl. XXXIV, figs. 45—48.

*Specific Characters.—Female.* Shell comparatively short and stout, with the alæform expansions well defined, but quite simple, seen laterally, suboval in shape, greatest height in the middle and about equal to  $\frac{2}{3}$  of the length, dorsal margin considerably arched, ventral scarcely at all sinuated, anterior extremity somewhat produced and obtusely rounded off at the end, posterior drawn out in the middle to a distinct obtusely conical protuberance defined above by a well-marked sinus;—seen dorsally, square-shaped in outline, with the greatest width (between the tips of the alæform expansions) somewhat exceeding  $\frac{2}{3}$  of the length, anterior extremity gradually tapered to a sharp point, posterior abruptly contracted and terminating in a conical prominence. —Valves with the alæform expansions somewhat prominent, triangular in shape, terminating behind in an obtuse-angular corner; surface of shell closely punctate. Limbs scarcely exhibiting any noticeable particularity in their structure.

*Male* not observed.

Colour of shell whitish, semipellucid.

Length of adult female 0.45 mm.

*Remarks.*—This is a very small species and may, at the first sight, easily be mistaken to be only the young of *C. latissimum*. It is however quite certainly distinct, differing conspicuously by the much more prominent alæform expansions, as also by the very distinct punctation of the valves.

*Occurrence.*—Two female specimens only of this form have as yet come under my notice. They were found at Korshavn, south coast of Norway, at a depth of about 30 fathoms, muddy sand. Norman has taken it also at Sartorø, near Bergen.

*Distribution.*—British Isles, Fosse de Cap Breton, Bay of Biscay.121. *Cytheropteron crassipinnatum*, Brady & Norman,

(Pl. CV, fig. 2).

*Cytheropteron crassipinnatum*, Brady & Norman, Mon. recent marine & freshwater Ostracoda 1889, p. 212, Pl. XX, figs. 16—18.

*Specific Characters.—Female.* Shell with the alæform expansions considerably produced, but without any apical or lateral spines, seen laterally, oblong oval in shape, a little higher in front than behind, greatest height somewhat exceeding half the length, dorsal margin rather arched in front and

sloping gently behind, ventral margin slightly sinuated, anterior extremity obtusely rounded, posterior produced to a blunt prominence located somewhat above the longitudinal axis of the shell;—seen dorsally, square-shaped, with the width, between the tips of the alæform expansions, somewhat less than the length, both extremities narrowly produced.—Valves rather thin and pellucid, with scattered small pits on the surface, alæform expansions rather prominent, triangular in shape, and projected about in the middle, each terminating in a somewhat swollen blunt corner.—Anterior antennæ with the terminal part rather thin and scarcely longer than the distal joint of the basal part, being distinctly quadriarticulate. Posterior antennæ of the usual structure. Legs rather slender and produced, last pair with the 1st joint of the terminal part considerably longer than the other 2 combined.

Colour of shell whitish.

Length of adult female 0.44 mm.

*Male* unknown.

*Remarks.*—This is also a very small species, and apparently nearly allied to the preceding one, though easily distinguished by the considerably more prominent alæform expansions and their rather different form. The shape of the shell is also somewhat dissimilar.

*Occurrence.*—A single female specimen of this form was found among some Ostracoda collected at Risør, south coast of Norway, at depths ranging from 10 to 30 fathoms.

*Distribution.*—West of Ireland.

## 122. *Cytheropteron angulatum*, Brady.

(Pl. CV, fig. 3).

*Cytheropteron angulatum*, Brady & Robertson, Ann. Mag. Nat. Hist., ser. IV, Vol. IX, p. 62, Pl. 2, figs. 7, 8.

*Specific Characters.*—*Female.* Shell of a peculiar angular appearance, with the alæform expansions rather slight, seen laterally, irregularly oblong oval in shape, somewhat higher in front than behind, greatest height slightly exceeding half the length, dorsal margin well arched in front of the middle, but sloping gently behind, ventral margin slightly sinuated anteriorly and curving evenly upwards behind, anterior extremity obtusely rounded, posterior somewhat obliquely truncated, with the upper corner distinctly projecting, lower obsolete;—seen dorsally, rather irregular in outline, with the greatest width in front of the middle and about equal to  $\frac{3}{5}$  of the length, side-edges evenly bowed in

front, but irregularly waved behind, anterior extremity gradually tapered to an obtuse point, posterior abruptly truncated at the end. Valves rather uneven in their posterior part, each valve being produced at the supero-posteal corner to a rather prominent obtuse protuberance and having laterally 2 or 3 nodiform prominences; alæform expansions located somewhat in front of the middle and quite simple, arcuate; surface of valves marked with rather slight scattered pittings.—Anterior antennæ with the terminal part 3-articulate and about twice as long as the distale joint of the basal part. Posterior antennæ of quite normal structure. Legs moderately slender, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

Colour of shell not yet ascertained.

Length of adult female 0.52 mm.

*Male*, unknown.

*Remarks*.—In the outward appearance of the shell this form differs conspicuously from any of the other known species: but the structure of the several appendages proves it in reality to be a true membre of the present genus.

*Occurrence*.—A single female specimen only of this peculiar form has as yet come under my notice. It was found among some Ostracoda collected, some years ago, at Risør, south coast of Norway, in depths ranging from 10 to 20 fathoms.

*Distribution*.—British Isles.

*Fossil*.—Scotland, Canada.

### 123. *Cytheropteron subcircinatum*, G. O. Sars.

(Pl. CV, fig. 4).

*Cytheropteron subcircinatum*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 81.

*Specific Characters*.—*Female*. Shell rather tumid, but with the alæform expansions poorly developed, seen laterally, short oval in shape, greatest height in the middle and about equal to  $\frac{3}{5}$  of the length, dorsal margin evenly arched and sloping somewhat more steeply behind than in front, ventral margin very slightly sinuated anteriorly and gently convex behind, anterior extremity narrowly rounded, posterior produced in the middle to a blunt prominence;—seen dorsally, almost circular in outline, though having the extremities somewhat produced, greatest width a little behind the middle and about equal to  $\frac{2}{3}$  of the length, side-edges evenly curved.—Valves rather thin, semipellucid, with the surface smooth and only marked with small scattered puncta; alæform expansions very little prominent, in the form of slight borders flanking



the shell near the ventral face. Anterior antennæ of the usual structure. Posterior antennæ with the dividing suture of penultimate joint imperfectly defined. Legs moderately slender, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

Colour of shell whitish.

Length of adult female 0.58 mm.

*Male* unknown.

*Remarks.*—The present species is easily recognised from those described in the preceding pages by the almost circular shape of the shell, as seen dorsally, a character which indeed has given rise to the specific name proposed.

*Occurrence.*—I have taken this form occasionally in the upper part of the Oslo Fjord, as also at Risør, south coast of Norway. Norman records it moreover from Lervik, Hardanger Fjord.

*Distribution.*—British Isles.

#### 124. *Cytheropteron testudo*, G. O. Sars.

(Pl. CVI, fig. 1).

*Cytheropteron testudo*, G. O. Sars, Chr. Vid. Selsk. Forh. 1869, p. 29.

*Specific Characters.*—*Female.* Shell moderately tumid, seen laterally, short oval or somewhat pyriform in shape, greatest height a little in front of the middle and about equal to  $\frac{3}{5}$  of the length, dorsal margin boldly arched and sloping rather steeply both in front and behind, ventral margin scarcely at all sinuated, being gently convex throughout, anterior extremity obliquely rounded, posterior drawn out to a very narrow and prominent caudiform projection located somewhat below the longitudinal axis of the shell:—seen dorsally, suboval in outline, with the greatest width nearly equal to the height, side-edges evenly curved, anterior extremity only slightly contracted and remarkably blunt at the end, posterior tapered to a narrow conical prominence.—Valves of rather firm consistency and but little pellucid, with the surface evenly convex and closely punctate, being moreover marked with scattered small tubercles; alæform expansions rather slight, in the form of evenly curved borders flanking the shell near its ventral face. Limbs on the whole quite normal in structure.

Colour of shell opacous white.

Length of adult female 0.50 mm.

*Male* unknown.

*Remarks.*—The present species is nearly allied to *C. subcircinatum*, but easily distinguished by the greatly projecting caudiform prominene of the shell behind, giving it a quite particular appearance. The shell differs moreover conspicuously in its sculpture, as also in the remarkably blunt anterior extremity, as seen dorsally.

*Occurrence.*—I have only met with this species at the Lofoten islands, where a few female specimens were taken, many years ago, from the considerable depth of 120 fathoms. Norman has recorded the species also from great deeps of the Hardanger Fjord.

*Distribution.*—Not yet observed out of Norway.

### 125. *Cytheropteron inflatum*, Brady.

(Pl. CVI, fig. 2).

*Cytheropteron inflatum*, Brady, Ann. Mag. Nat. Hist., ser. IV, Vol. II, p. 33, figs. 8–10.

*Specific Characters.*—*Female.* Shell moderately tumid, seen laterally, oval subtrigonal in shape, greatest height in the middle and about equal to  $\frac{3}{5}$  of the length, dorsal margin very strongly, almost gibbously arched in the middle and sloping steeply, with a slight concavity, to each extremity, ventral margin slightly sinuated and curving gently upwards behind, anterior extremity somewhat obliquely rounded, posterior obtusely produced at the end;—seen dorsally, regularly fusiform in outline, with the greatest width in the middle and about equal to the height, side-edges quite evenly curved, both extremities gradually contracted and nearly equal.—Valves rather thin, with the surface smooth, only marked with slight scattered pits; alæform expansions simple rounded off. Limbs of a structure very similar to that in *C. subcircinatum*.

Colour of shell whitish semipellucid.

Length of adult female 0.55 mm.

*Male* unknown.

*Remarks.*—The above described species agrees with the 2 preceding ones in the quite simple rounded alæform expansions of the valves, but is easily distinguished from either of them by the general shape of the shell. The specific name is somewhat inappropriate, as the shell in reality is less tumid than in most of the other species.

*Occurrence.*—A single female specimen only of this form has as yet come under my notice. It was taken at Korshavn, south coast of Norway from a depth of about 30 fathoms, muddy sand.

*Distribution.*—British Isles.

126. *Cytheropteron nodosum*, Brady.

(Pl. CVI, fig. 3).

*Cytheropteron nodosum*, Brady, Mon. Brit. Ostracoda, p. 448, Pl. XXXIV, figs. 31—34.

*Specific Characters.*—*Female.* Shell comparatively more tumid than in the preceding species, seen laterally, suboval in shape, greatest height in the middle and about equal to  $\frac{3}{5}$  of the length, dorsal margin quite evenly arched throughout, ventral slightly sinuated in front of the middle, anterior extremity obliquely rounded, posterior bluntly produced at the end;—seen dorsally, broadly ovate in outline, with the greatest width somewhat behind the middle and rather exceeding  $\frac{3}{5}$  of the length, side-edges evenly curved, both extremities pointed and nearly equal.—Valves rather thin, semipellucid, each exhibiting dorsally 2 rounded nodiform protuberances, the one at some distance from the anterior extremity, the other quite posteriorly; alæform expansions rather slight and quite evenly rounded off; surface of valves faintly punctate. Antennæ almost exactly as in the preceding species. Legs however comparatively more slender, last pair with the 1st joint of the terminal part exceeding somewhat in length the other 2 combined.

Colour of shell whitish, semipellucid.

Length of adult female 0.58 mm.

*Male* unknown.

*Remarks.*—This species is closely allied to the preceding one, and may indeed, at the first sight, easily be confounded with it. On a closer examination it is however found to differ somewhat in the shape of the shell, and more particularly in the presence of the characteristic nodiform protuberances on the dorsal face of the valves, to which the name of the species alludes.

*Occurrence.*—Of this form likewise only a single female specimen has as yet come under my notice. It was found in the same locality as the preceding species. Norman has taken it also in 2 localities of our western coast.

*Distribution.*—British Isles, Fosse de Cap Breton, Bay of Biscay, Gulf of St. Lawrence.

*Fossil.*—British Isles, Canada.

## Subfam. 6. Bythocytherinæ.

*Remarks.*—The type of this subfamily is the genus *Bythocythere* G. O. Sars, with which the somewhat anomalous genus *Pseudocythere* G. O. Sars apparently ought to be associated. Moreover I have felt justified to consider



the form previously recorded as *Bythocythere simplex* Norman, as the type of a particular genus likewise included within the present subfamily.

Gen. 45. **Bythocythere**, G. O. Sars, 1865.

*Generic Characters*.—Shell of somewhat varying shape, but as a rule rather tumid, with more or less conspicuous lateral expansions and with the posterior extremity obtusely produced. Valves comparatively thin, with the surface smooth or faintly punctate; hinge imperfectly developed. Eyes in most cases wanting. Anterior antennæ with the segments of the basal part rather dilated, the distal one obpyriform in shape and provided with 3 bristles, one on each side and one rather smaller at the end; terminal part very narrow and flexible, 4-articulate, with the joints nearly equal in length and clothed with scattered simple setæ. Posterior antennæ with the 1st joint of the terminal part rather large, middle joint not subdivided and having the anterior setiferous ledge close to the end, last joint armed with 3 claws successively increasing in length posteriorly; flagellum with the knee above the middle. Mandibular palp with the vibratory plate well developed, fringed with 6—8 plumose setæ. Maxillæ with both the masticatory lobes and the palp short and stout, vibratory plate comparatively large and provided at the base with 4 densely crowded deflexed bristles. Legs slender and prolonged, seta at the base of the 1st pair replaced by a small lamella divided at the end into 2 finely ciliated setiform lashes and having moreover 2 simple bristles laterally; each of the 2 proximal joints of the terminal part in all the pairs provided at the end anteriorly with a well defined seta. Caudal lamellæ somewhat deflexed and conically produced, with one apical and 2 lateral bristles. Copulative appendages of male comparatively small, with the terminal part well defined and abruptly deflexed.

*Remarks*.—This genus was established in the year 1865 by the present author and has been admitted by all subsequent authors. It is here taken in a somewhat more restricted sense than at first adopted, one of the species, *B. simplex* Norman being, as mentioned above, discarded to form the type of a particular genus, *Macrocythere*. 5 species referable to the present genus will be described in the sequel.

127. **Bythocythere turgida**, G. O. Sars.

(Pl. CVII).

*Bythocythere turgida*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 84.

*Specific Characters*.—*Female*. Shell very tumid, with the ventral face flattened, seen laterally, short subrhomboid in shape, nearly equally high in

front and behind, greatest height about equal to  $\frac{3}{5}$  of the length, dorsal margin very slightly arched and somewhat angularly bent in the ocular region, ventral margin indistinctly sinuated in front and rather bowed behind, anterior extremity obliquely rounded, posterior produced above the middle to a blunt prominence defined dorsally by a slight sinus;—seen dorsally, broadly ovate or cordiform in outline, with the greatest width behind and almost attaining  $\frac{2}{3}$  of the length, side-edges gradually expanding backwards and abruptly bent near the posterior part of the shell, anterior extremity obtusely pointed, posterior abruptly contracted to a conical prominence;—end-view short pyramidal.—Valves of somewhat firmer consistency than in most of the other species, though rather pellucid, each exhibiting a well marked obtuse expansion flanking the side below and terminating behind in a rounded corner; surface otherwise smooth and marked with small rounded pits more conspicuous in the lower part of the shell, posterior edge of each valve fringed below with a regular row of small denticles. Eyes distinctly visible in the living animal, though rather poorly developed, with light pigment.—Anterior antennæ with the terminal part considerably exceeding in length the basal one, last joint very narrow and carrying on the tip a bunch of rather long and thin bristles. Posterior antennæ with the 1st joint of the terminal part fully twice as long as broad, middle joint much narrower, last joint very small. Legs moderately slender, last pair with the 1st joint of the terminal part shorter than the other 2 combined.

*Male* very like the female both in size and in the general shape of the shell. Copulative appendages with the terminal part considerably produced, lanceolate in form.

Colour of shell light yellowish white, variagated with a few small reddish specks dorsally.

Length of adult female 0.90 mm.

*Remarks.*—The above-described form ought to be regarded as the type of the present genus, being that first named of the species originally recorded. It is easily recognised from the other known species by the short and compact shape of the shell and by the presence of distinct, though rather poorly developed eyes.

*Occurrence.*—I first met with this form in the Hallandspol near Drøbak, where some few specimens were found at a depth of about 10 fathoms, muddy bottom, and I have subsequently also taken it in several other places, both on the south and west coasts of Norway in moderate depths.

*Distribution.*—British Isles, Spitzbergen, Gulf of St. Lawrence.

128. *Bythocythere constricta*, G. O. Sars.

(Pl. CVIII, fig. 1).

*Bythocythere constricta*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 85.

*Specific Characters.*—*Female.* Shell much less compact than in the preceding species, seen laterally, oblong subquadrangular in shape, somewhat higher behind than in front, greatest height scarcely exceeding half the length, dorsal margin perfectly straight and horizontal, being somewhat angularly bent both in front and behind, ventral margin slightly sinuated anteriorly and considerably bowed behind, anterior extremity obtusely rounded off, posterior produced, considerably above the middle, to a well-marked rather broad protuberance obliquely truncated at the end;—seen dorsally, irregularly fusiform in outline, exhibiting, somewhat in front of the middle, a very conspicuous deep constriction, side-edges both in front and behind the constriction abruptly bowed, greatest width somewhat less than the height, anterior extremity obtusely pointed, posterior gradually tapered to a narrow conical prominence. Valves very thin and pellucid, with the lateral expansions rather slight, surface slightly rugulose and faintly marked with small scattered pits, edges of valves quite smooth. Eyes wholly absent. Antennæ of a structure very similar to that in the preceding species. Legs however comparatively more slender and prolonged, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

*Male* of smaller size than female, but resembling it in the general shape of the shell, though having the posterior part somewhat broader, as seen laterally. Copulative appendages of a structure very similar to that in the preceding species.

Colour of shell uniformly whitish pellucid.

Length of adult female 0.80 mm.

*Remarks.*—Though closely agreeing with the preceeding species in the structure of the several appendages, the present form is at once distinguished by the rather different appearance of the shell, and more particularly by its very conspicuous mediate constriction, as seen dorsally, a character which indeed has given rise to the specific name proposed.

*Occurrence.*—This form was originally described from a single female specimen taken at the islands Bollærene in the lower part of the Oslo Fjord at a depth of 30—40 fathoms, soft clayish bottom. I have subsequently also met with it occasionally in some other places on the Norwegian coast, at similar depths.



*Distribution*.—British Isles, Fosse de Cap Breton, Bay of Biscay, Spitzbergen.

*Fossil*.—Holland, Skotland.

129. *Bythocythere Bradyi*, G. O. Sars, n. sp.

(Pl. CVIII, fig. 2).

*Specific Characters*.—*Female*.—Shell moderately tumid, seen laterally, oblong oval in shape, about equally high in front and behind, greatest height not fully attaining  $\frac{3}{5}$  of the length, dorsal margin almost straight and scarcely angularly bent either in front or behind, ventral margin slightly sinuated in front and evenly convex behind, anterior extremity obtusely rounded, posterior produced a little above the middle to a blunt protuberance;—seen dorsally, rather regularly fusiform in outline, without any distinctly marked mediate constriction, greatest width in the middle and nearly equal to half the length, anterior extremity obtusely pointed, posterior abruptly contracted to a short conical prominence.—Valves of somewhat firmer consistency than in the preceding species and less pellucid, with the lateral expansions rather slight and conspicuously oblique behind, surface quite smooth and marked with somewhat distant small pits, edges unarmed. Eyes absent. Structure of the several limbs very little different from that in the preceding species.

Colour of shell not yet ascertained.

Length of adult female 0.73 mm.

*Male* unknown.

*Remarks*.—This form has been erroneously described and figured by Brady as the male of *B. constricta*. It is however quite certainly a distinct species, and may properly bear the name of its discoverer.

*Occurrence*.—Several specimens of this form, all of the female sex were found among some Ostracoda collected, several years ago, at Bukken, outside the Stavanger Fjord, from a depth of about 40 fathoms. I have not met with it in any other place of the Norwegian coast.

*Distribution* —British Isles.

130. *Bythocythere dromedaria*, G. O. Sars.

(Pl. CVIII, fig. 3).

*Bythocythere dromedaria*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 86.

*Specific Characters*.—*Female*. Shell rather tumid, seen laterally, of a somewhat irregular shape, being gibbously vaulted in front and abruptly con-

tracted behind, greatest height about equal to  $\frac{3}{5}$  of the length, dorsal margin forming anteriorly a bold and quite even curve, with no trace of angle in the ocular region, and followed by a slight concavity defined behind by a distinct angular corner, ventral margin slightly sinuated in front and evenly bowed behind, anterior extremity somewhat obliquely rounded, posterior produced in the middle to a well-defined blunt protuberance;—seen dorsally, broadly fusiform in outline, with the greatest width about equal to half the length, side-edges quite evenly curved, both extremities abruptly contracted and acuminate, the posterior somewhat more produced than the anterior. Valves thin and pellucid, with the surface smooth and only marked with small distant pits, edges unarmed, lateral expansions but slightly prominent and obtusely rounded. Eyes absent. Antennæ of a similar structure to that in *B. constricta*. Legs very slender and narrow, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

*Male* resembling the female in the general shape of the shell. Copulative appendages distinguished from those in the other species by the short cordiform shape of the terminal part.

Colour of shell whitish pellucid.

Length of adult female 0.78 mm.

*Remarks.*—This species is easily recognised from those described in the preceding pages, by the peculiar shape of the shell, as seen laterally, the gibbously arched dorsal face being particularly very characteristic, and having indeed given rise to the specific name proposed.

*Occurrence.*—Some few specimens of this form were taken, many years ago, in the upper part of the Oslo Fjord, from a depth of about 50 fathoms, muddy bottom, and I have subsequently also met with it occasionally in some other places on the Norwegian coast.

*Distribution.*—As yet not recorded out of Norway.

### 131. *Bythocythere insignis*, G. O. Sars.

(Pl. CIX, fig. 1).

*Bythocythere insignis*, G. O. Sars, Chr. Vid. Selsk. Forhandl. 1869, p. 173.

*Specific Characters.*—*Female.* Shell remarkably expanded laterally, seen from the side, oval subrhomboid in shape, about equally high in front and behind, greatest height about equal to half the length, dorsal margin nearly straight, though exhibiting in front a slight convexity defined from the anterior edge by a short sinus, ventral margin faintly sinuated anteriorly and rather

obliquely ascending behind, anterior extremity bluntly rounded off, posterior drawn out quite above to a rather prominent obtuse protuberance;—seen dorsally, very broad, square-shaped, with the greatest width, between the tips of the lateral expansions, about equal to  $\frac{2}{3}$  of the length, side-edges angularly bent behind the middle, anterior extremity obtusely pointed, posterior abruptly contracted to a narrow conical prominence.—Valves rather thin, with the surface slightly rugulose and marked with distant small pits, posterior edges finely denticulate, lateral expansions very prominent, alæform, and almost rectangular in shape, each terminating in an obtusely rounded corner and having moreover traces of 2 or 3 blunt prominences of the hind margin. Eyes absent. Structure of the limbs quite normal.

*Male* somewhat smaller than female, and having the shell comparatively narrower, as seen laterally. Copulative appendages with the terminal part oval in shape, and having attached to its base in front a peculiar somewhat twisted deflexed lobule.

Colour of shell whitish pellucid.

Length of adult female 0.70 mm.

*Remarks.*—In the outward appearance this form looks rather different from the other known species, and bears a perplexing similarity to some of the species of the genus *Cytheropteron*. The structure of the several limbs proves it however to be a true member of the present genus, being apparently nearly allied to *B. dromedaria*.

*Occurrence.*—I have hitherto only met with this species off the Lofoten islands, where 2 specimens, male and female, were taken in the considerable depth of 120 fathoms, soft clay.

*Distribution.*—As yet not recorded out of Norway.

#### Gen. 46. **Pseudocythere**, G. O. Sars, 1865.

*Generic Characters.*—Shell much compressed, without any lateral expansions; posterior extremity produced above to a caudiform prominence. Surface of valves quite smooth, without any obvious sculpture, inner duplicatures rather broad, marginal zone well marked and crossed by distant pore-channels; hinge imperfect. Eyes wholly absent. Anterior antennæ with the terminal part distinctly 5-articulate, the 4 proximal joints rather short and stout, last joint abruptly much narrower and greatly prolonged, setæ of this part unusually long and slender, forming together a dense apical fascicle. Posterior



antennæ with the middle joint of the terminal part very narrow and prolonged, without any setiferous ledge anteriorly, but distinctly subdivided above the middle. Mandibles with the cutting teeth narrow unguiform, palp of moderate size, with the vibratory plate well developed. Maxillæ with the masticatory lobes narrowly produced and the 2 joints of the palp nearly equal in length, vibratory plate with only 3 deflexed setæ at the base. Legs slender and of a similar structure to that in *Bythocythere*. Caudal lamellæ extremely small, bisetose. Copulative appendages of male comparatively poorly developed.

*Remarks.*—This genus is evidently somewhat related to *Bythocythere*, so as properly to be associated with it in the same subfamily, differing however very conspicuously in the general appearance of the shell, as also in the structure of some of the appendages, especially that of the antennæ. In addition to the form described below, 3 other species referable to the present genus have been recorded from more southern latitudes.

132. *Pseudocythere caudata*, G. O. Sars.

(Pl. CIX, f.g. 2).

*Pseudocythere caudata*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 88.

*Specific Characters.*—*Female.* Shell, seen laterally, oval subquadrangular in shape, greatest height quite in front and about equal to half the length, dorsal margin nearly straight and continuous with the anterior edge, sloping gently behind, ventral margin slightly sinuated in the middle and terminating behind in a well-defined corner tipped with a small dentiform projection, anterior extremity broadly rounded off, posterior somewhat obliquely truncated and produced above to a rather prominent protuberance continuous with the dorsal margin, but well defined below;—seen dorsally, narrow lancet-shaped, with the greatest width somewhat in front of the middle and not even attaining  $\frac{1}{3}$  of the length, both extremities narrowly produced and acuminate. Valves of rather firm consistency, but highly pellucid, with the surface smooth and polished and almost bare of hairs.—Anterior antennæ with the distal segment of the basal part scarcely thickened proximally and provided with 2 slender setæ, one in the middle of the anterior edge, the other at the end behind, the 4 proximal joints of the terminal part successively diminishing in size, last joint almost as long as these joints combined, and extremely narrow, linear in shape. Posterior antennæ with the dividing suture of the penultimate joint located at about the end of the upper  $\frac{1}{3}$  of the joint, distal part extremely narrow, apical claws of moderate length and nearly equal. Legs very narrow

and prolonged, basal lamella of 1st pair very small and provided with 4 delicate setæ, last pair with the 1st joint of the terminal part shorter than the other 2 combined.

*Male* a little smaller than female and having the shell comparatively narrower, with the dorsal margin slightly concav. Copulative appendages very small, with the basal part only slightly dilated, terminal part well defined, in the form of an oval deflexed lamella somewhat angularly produced behind.

Colour of shell whitish, transparent.

Length of adult female scarcely exceeding 0.55 mm.

*Remarks.*—The above-described form is easily recognisable from any of our other Cytherids, both as to the general appearance of the shell and to the somewhat anomalous structure of the antennæ. It is the type of the present genus.

*Occurrence.*—I first found this form in the upper part of the Oslo Fjord at a depth of about 40 fathoms, soft clayish bottom, and have subsequently met with it also in some other places on the Norwegian coast up to the Trondhjem Fjord in similar depths. In spite of its small size, it is easily detected in any sample taken up by the dredge, owing to a particularity which it shares with some other Cytherids, viz., that the animals, when coming in contact with the air, remain floating on the surface of the water.

*Distribution.*—Britisch Isles, Fosse de Cap Breton, Bay of Biscay, Mediterranean, Kerguelen.

*Fossil.*—Scotland, Ireland.

#### Gen. 47. *Macrocythere*, G. O. Sars, n.

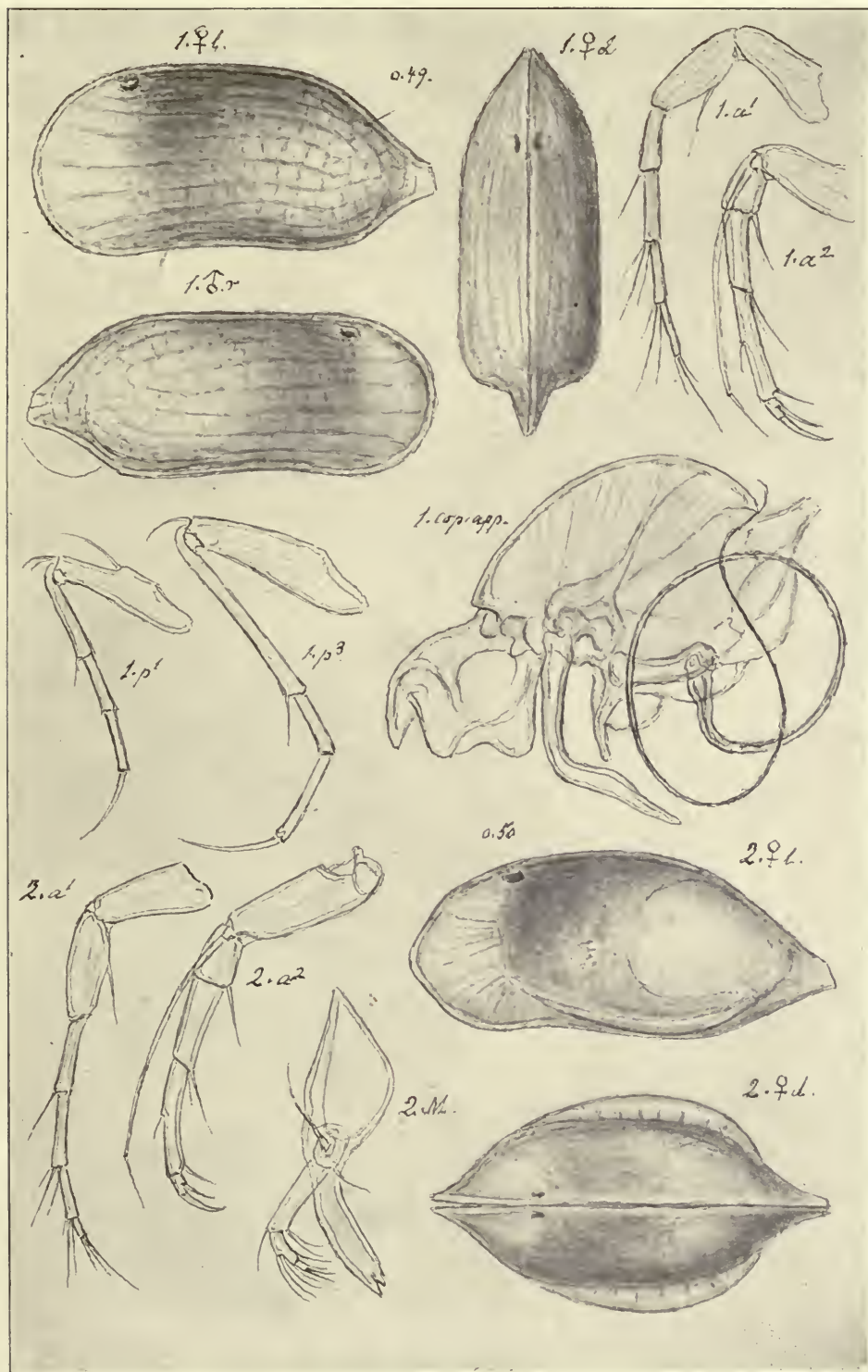
*Generic Characters.*—Shell elongate, compressed, sharply pointed behind, without any lateral expansions. Hinge imperfectly developed. Eyes absent. Anterior antennæ with the segments of the basal part considerably dilated, terminal part comparatively shorter than in *Bythocythere*, but, as in that genus, composed of 4 joints only slightly differing in length. Posterior antennæ without any dividing suture of the penultimate joint. Mandibles and maxillæ of a structure nearly agreeing with that in *Bythocythere*. Legs of female likewise rather similar, last pair in male however conspicuously transformed, subprehensile. Caudal lamellæ conical in shape, with one rather long apical seta and 2 much shorter lateral bristles. Copulative appendages of male comparatively large and attached to a fleshy stalk, terminal part well developed and somewhat bent in the middle.

# Ostracoda

Cytheridæ

Podocopa

Pl. XCVII



G. O. Sars del.

1. *Cytherura striata*, G. O. Sars
2. — *producta*, Brady



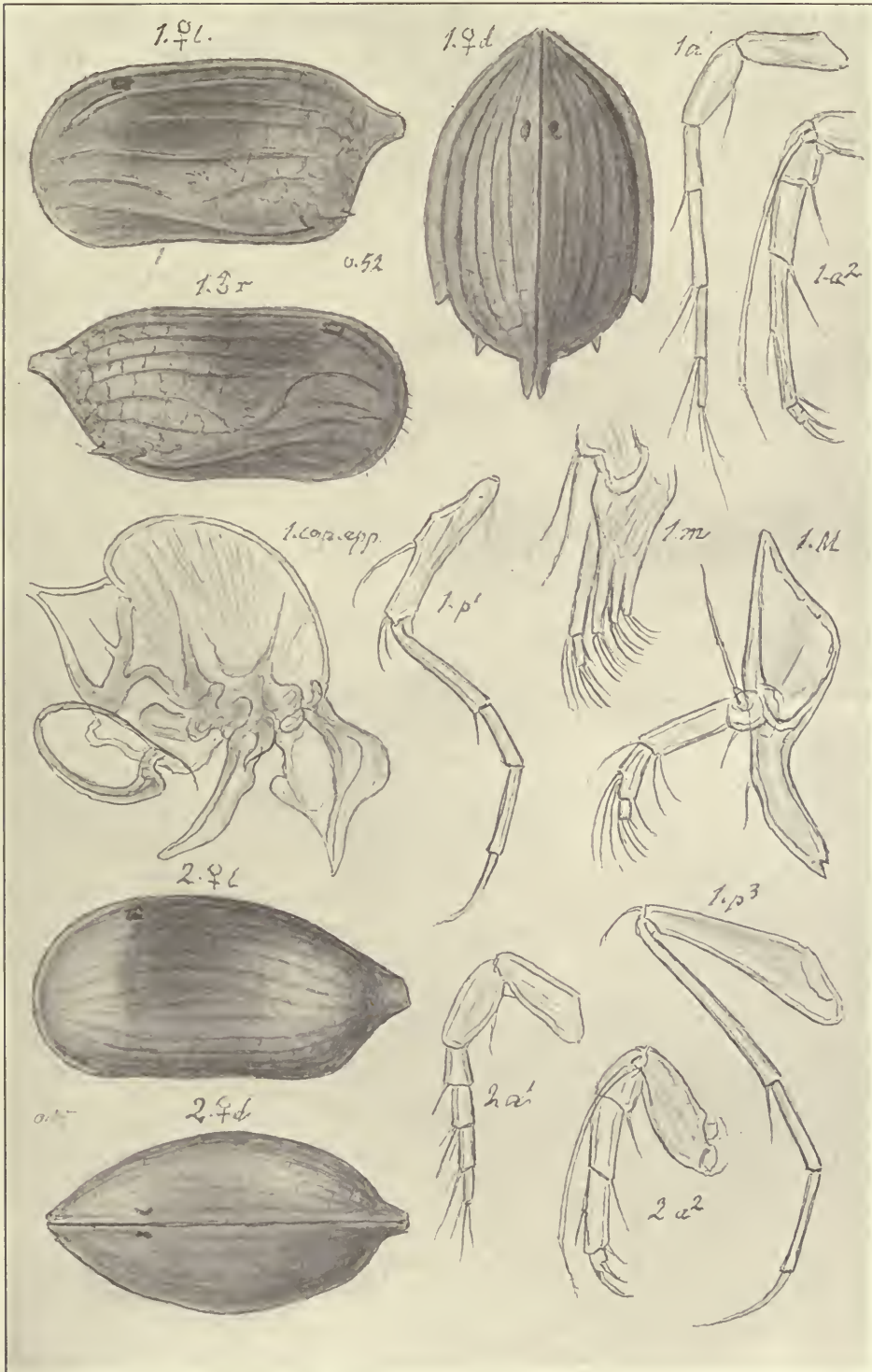


# Ostracoda

Cytheridæ

Podocopa

Pl. XCVIII



G. O. Sars del.

1. *Cytherura acuticostata*, G. O. Sars
2. — *lineata*, Brady



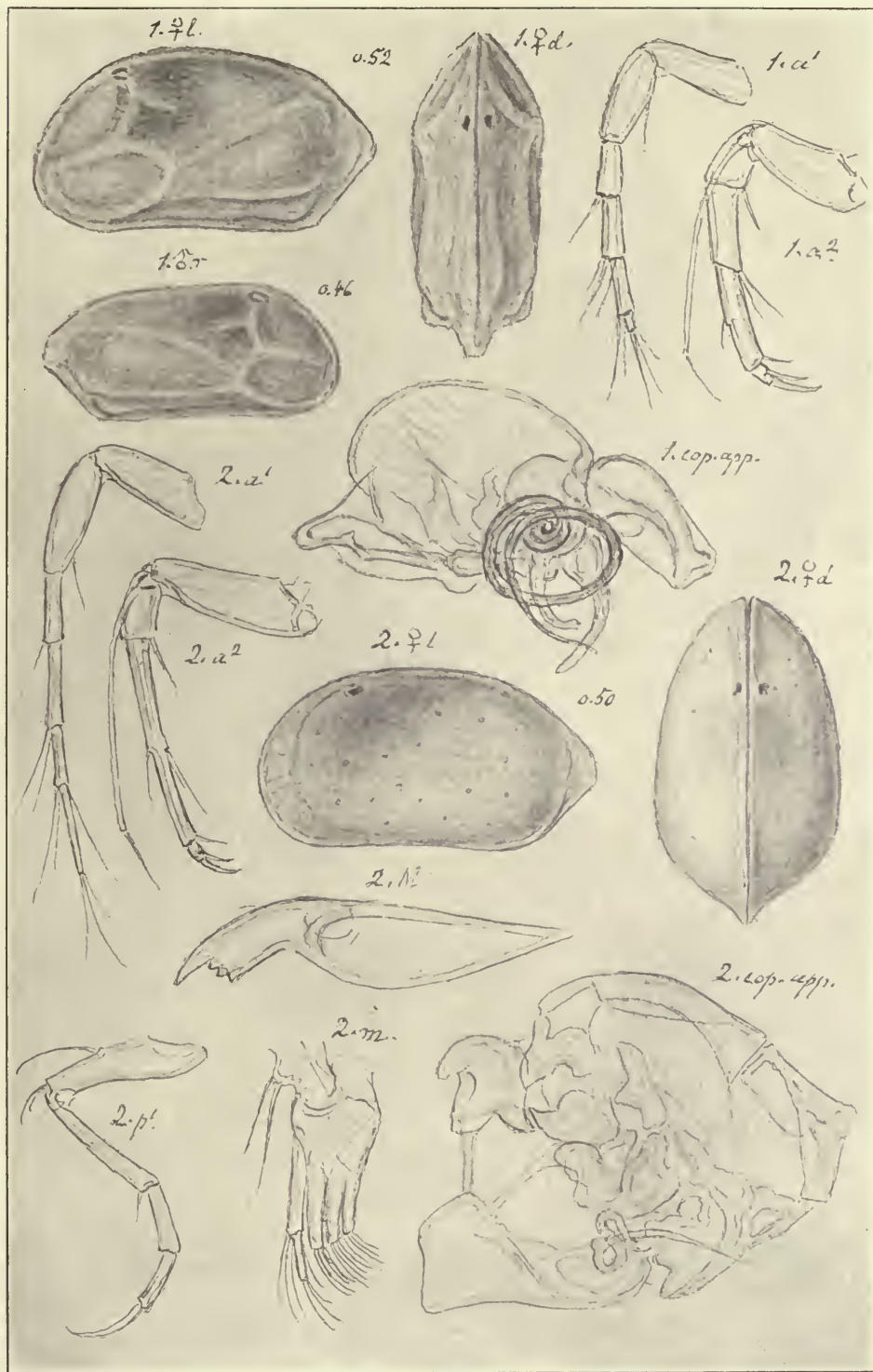


# Ostracoda

Cytheridæ

Podocopa

Pl. XCIX



G. O. Sars del.

1. *Cytherura undata*, G. O. Sars
2. — *fulva*, Brady

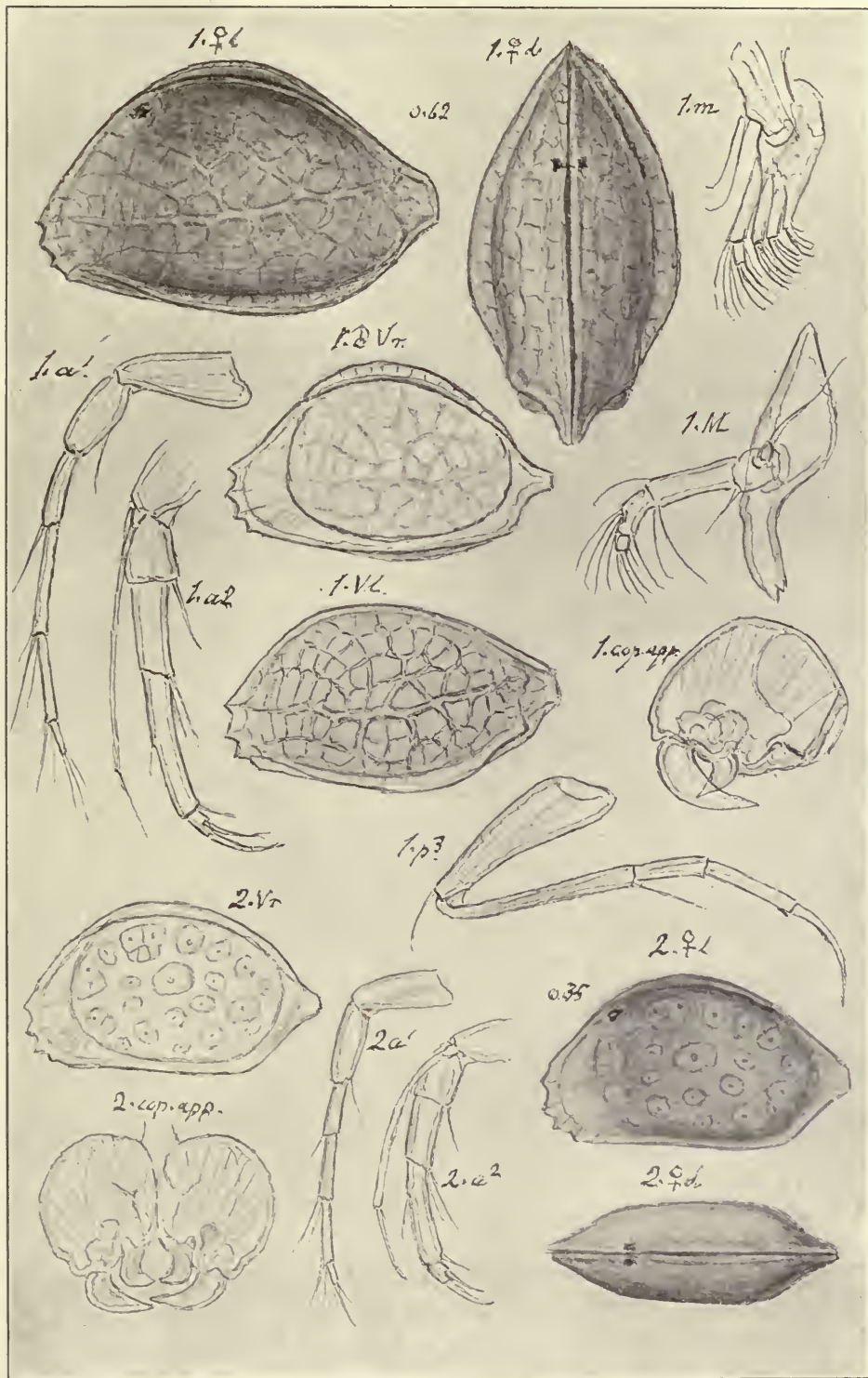


# Ostracoda

Cytheridæ

Podocopa

Pl. C



G. O. Sars del.

1. *Cytherura*<sup>a, cl</sup> *dathrata*, G. O. Sars
2. — *cellulosa*, Norman



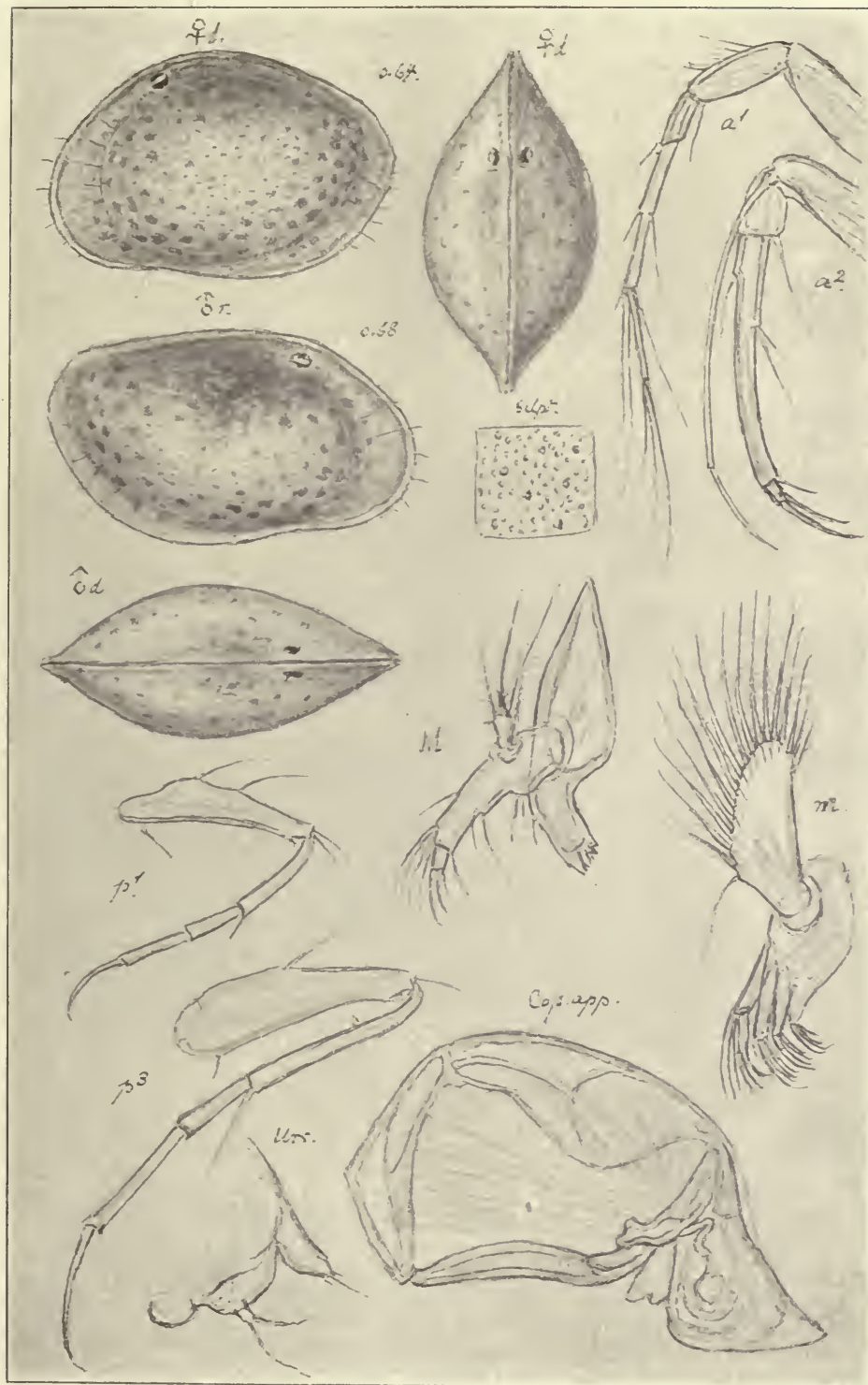


# Ostracoda

Cytheridæ

Podocopa

Pl. CI



G. O. Sars del.

*Loxoconcha impressa*, Baird



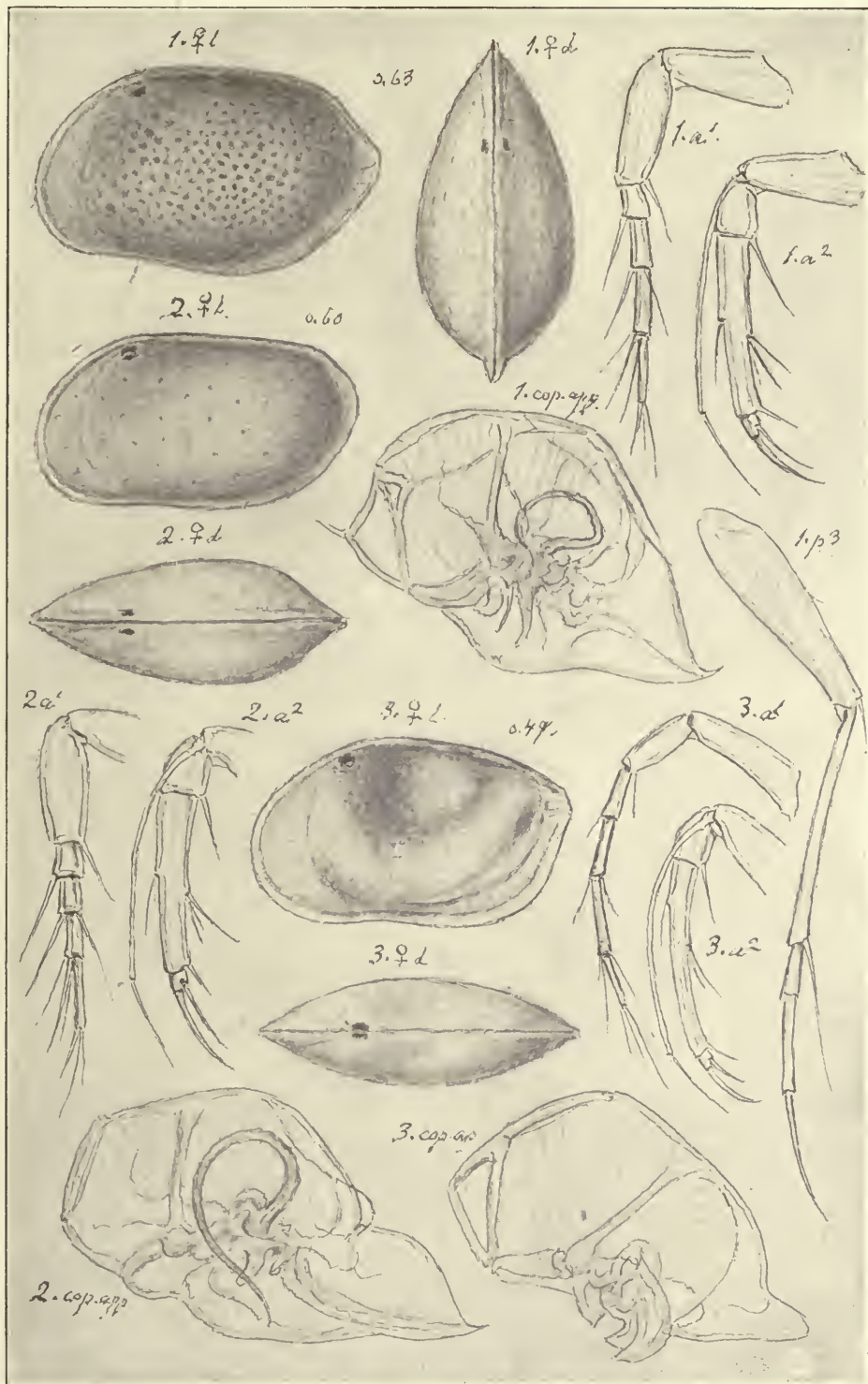


# Ostracoda

Cytheridæ

Podocopa

Pl. CII



G. O. Sars del.

1. *Loxoconcha granulata*, G. O. Sars
2. — *tamarindus*, Jones
3. — *fragilis*, G. O. Sars

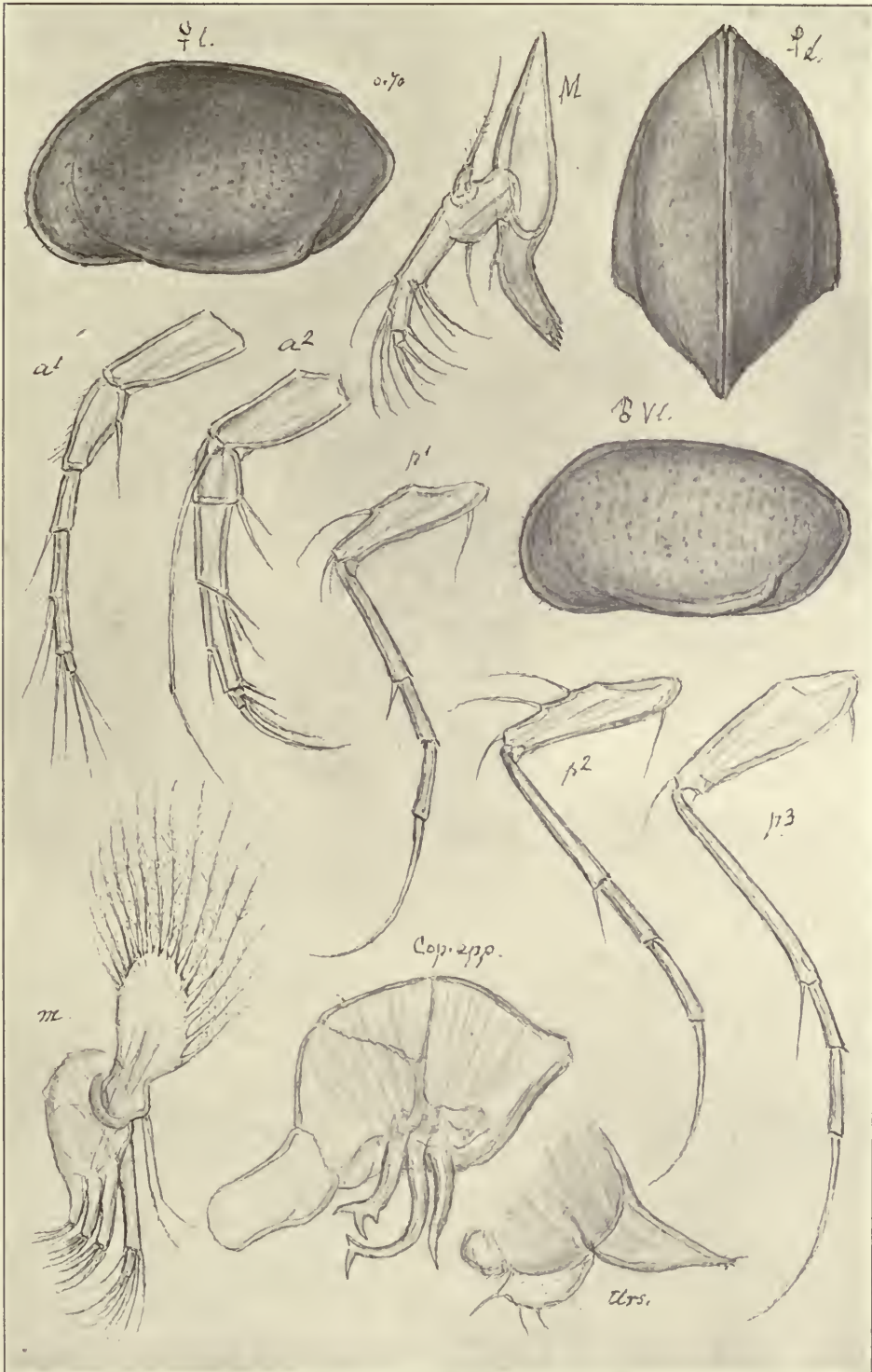


# Ostracoda

Cytheridæ

Podocopa

Pl. CIII



G. O. Sars del.

*Cytheropteron latissimum*, Norman



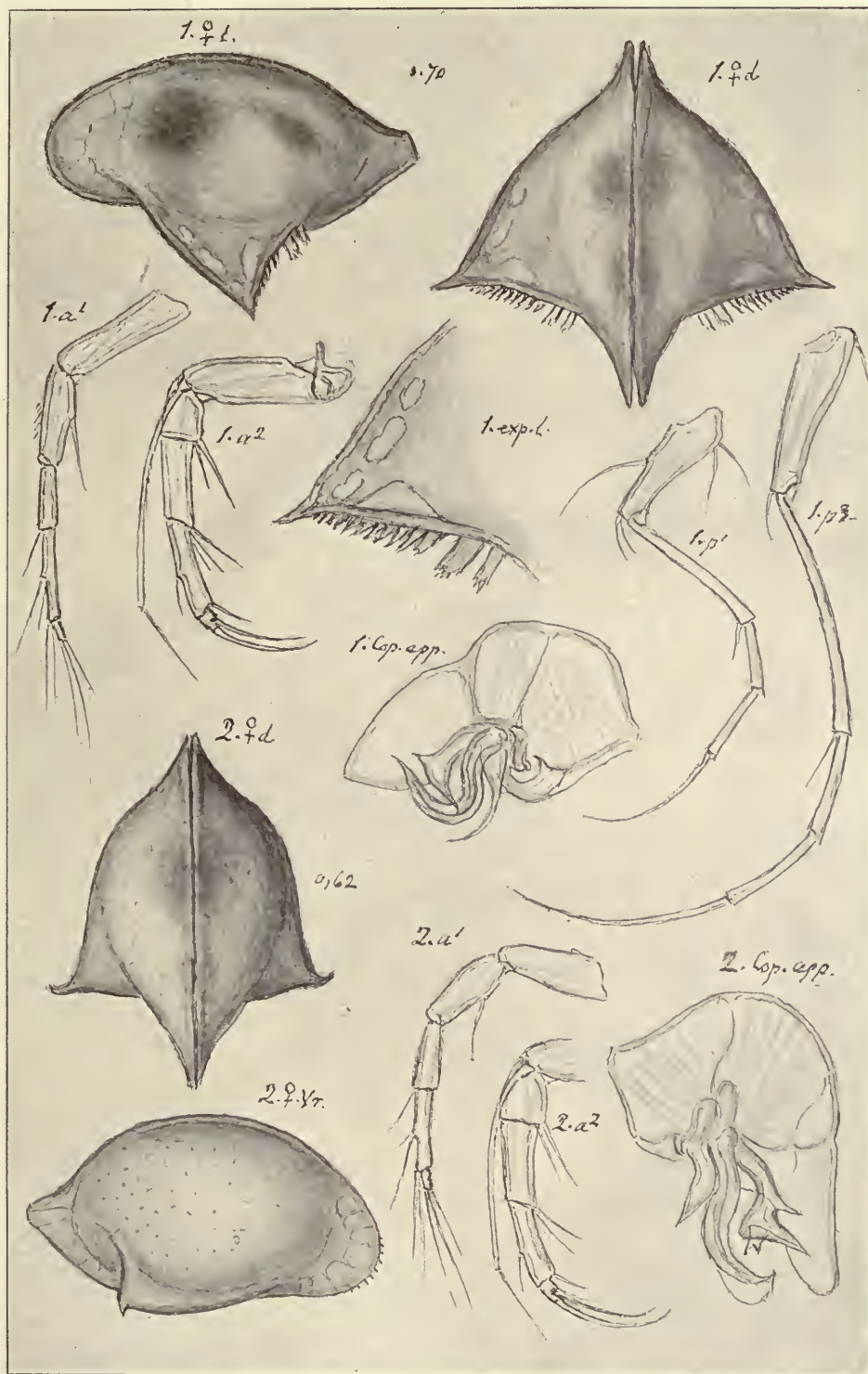


# Ostracoda

Cytheridæ

Podocopa

Pl. CIV



G. O. Sars del.

1. *Cytheropteron alatum*, G. O. Sars
2. — *hamatum*, G. O. Sars



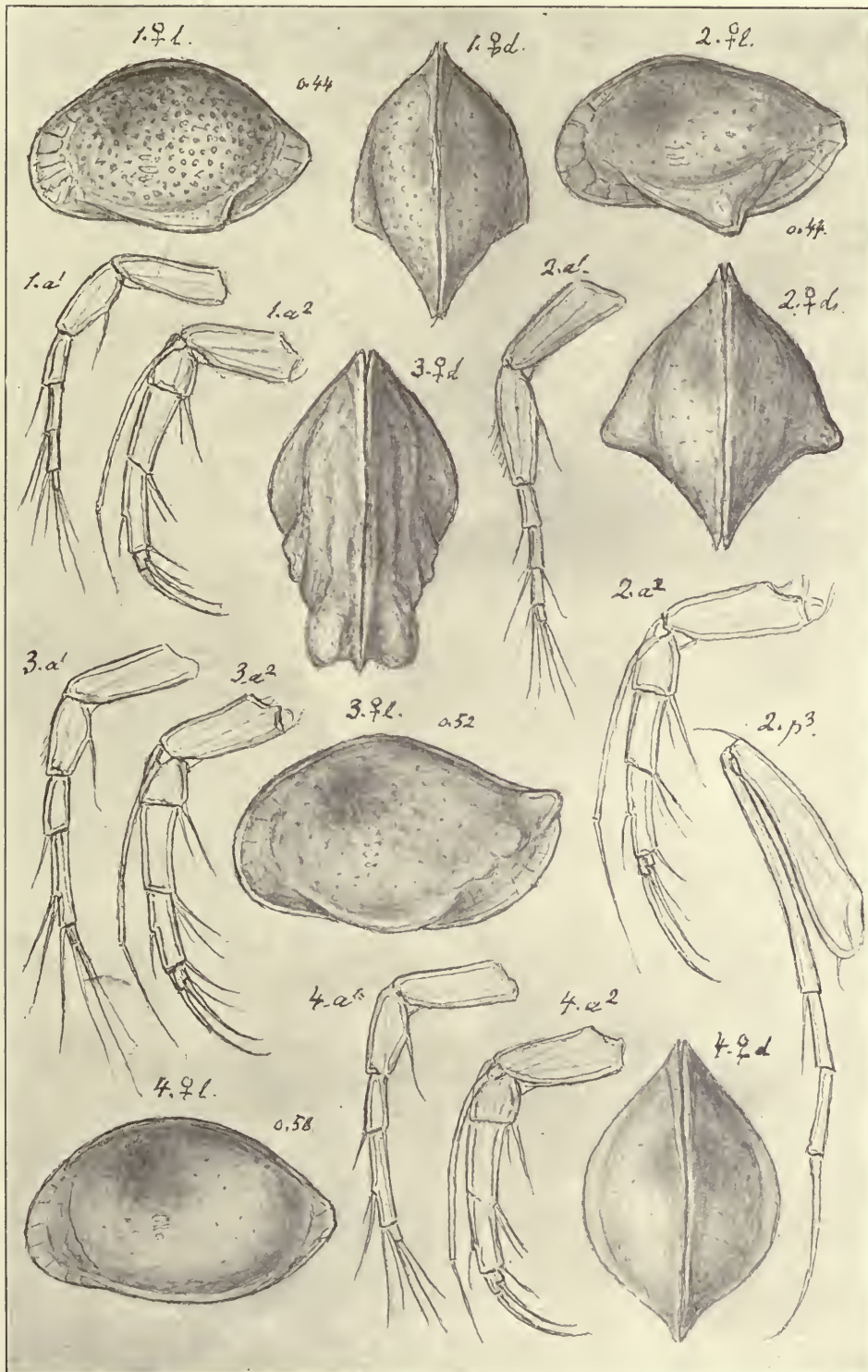


# Ostracoda

Cytheridæ

Podocopa

Pl. CV



G. O. Sars del.

1. *Cytheropteron punctatum*, Brady
2. — *crassipinnatum*, Brady & Norm.
3. — *angulatum*, Brady
4. — *subcircinatum*, G. O. Sars

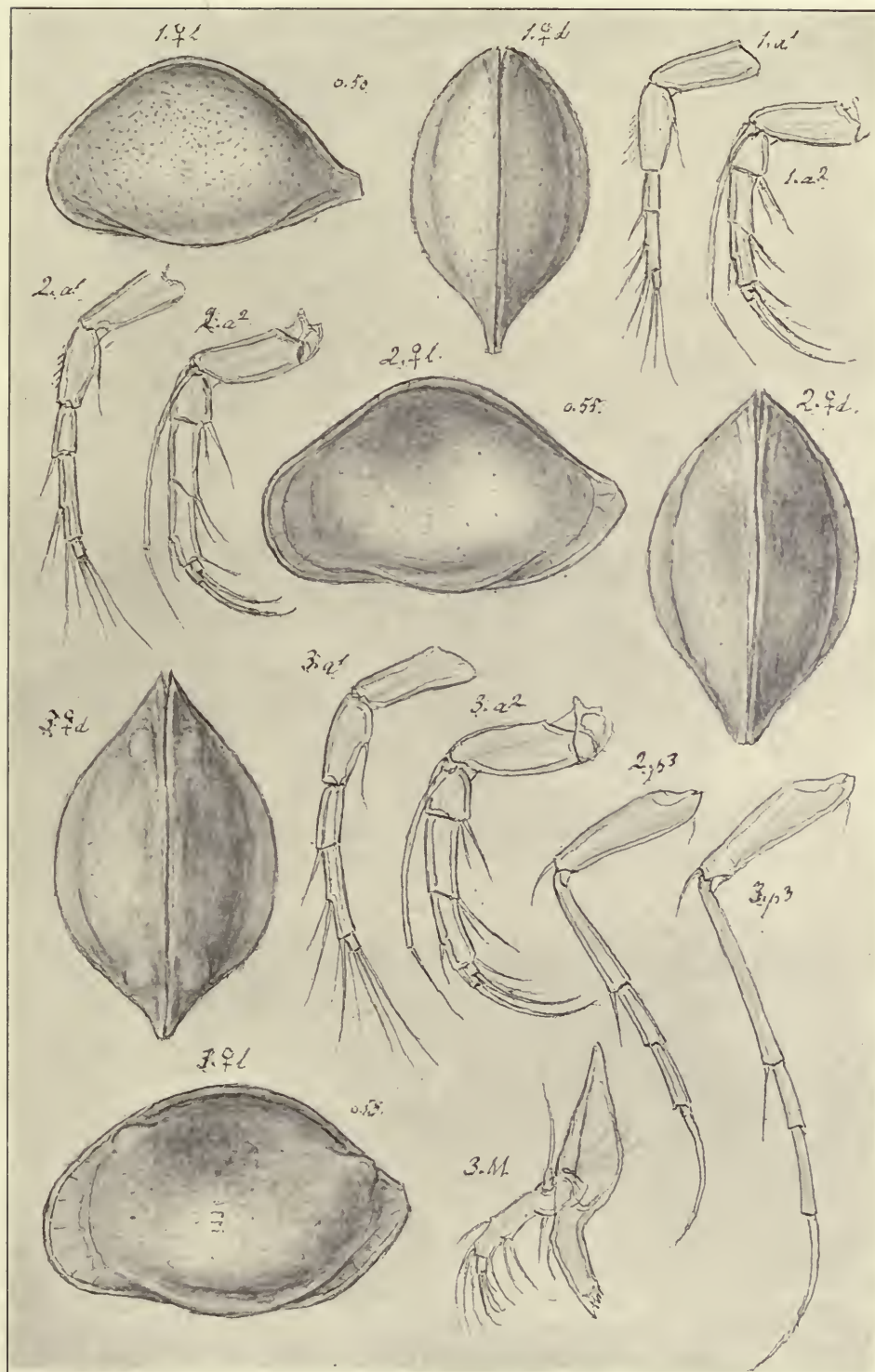


# Ostracoda

Cytheridæ

Podocopa

Pl. CVI



G. O. Sars del.

1. *Cytheropteron testudo*, G. O. Sars
2. — *inflatum*, Brady
3. — *nodosum*, Brady



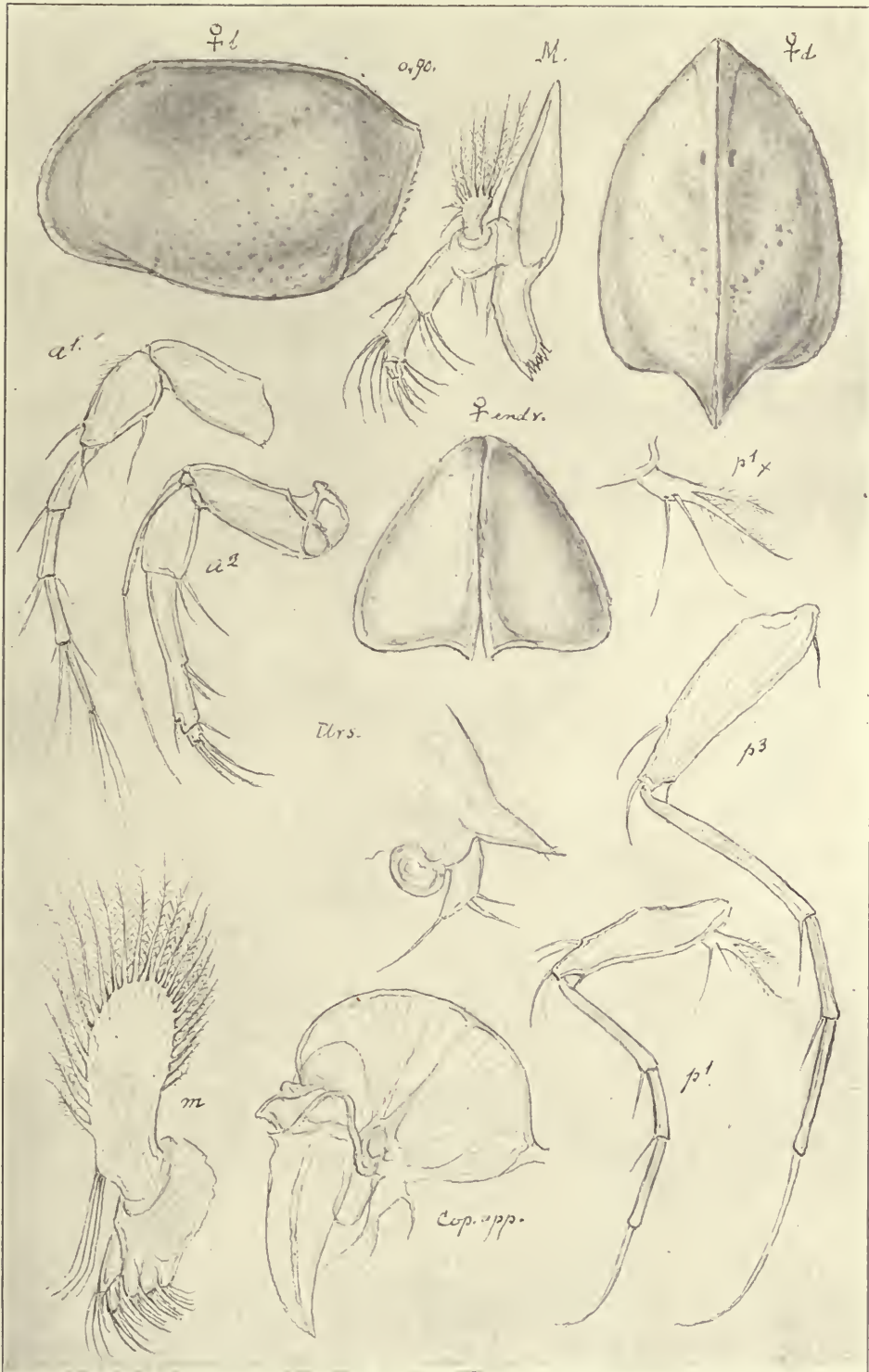


# Ostracoda

Cytheridæ

Podocopa

Pl. CVII



G. O. Sars del.

*Bythocythere turgida*, G. O. Sars



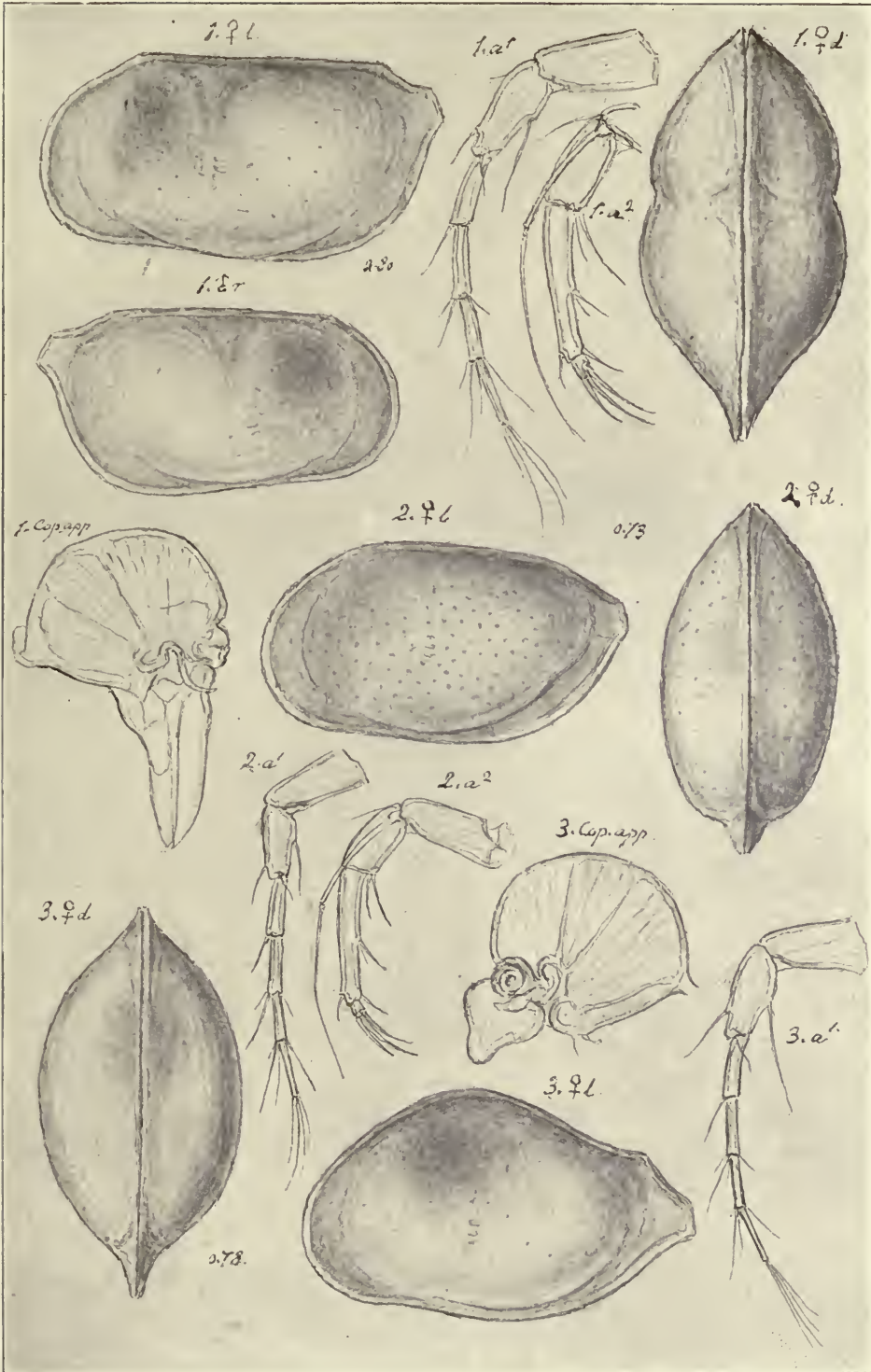


# Ostracoda

Cytheridæ

Podocopa

Pl. CVIII



G. O. Sars del.

1. *Bythocythere constricta*, G. O. Sars
2. — *bradyi*, G. O. Sars
3. — *dromedaria*, G. O. Sars

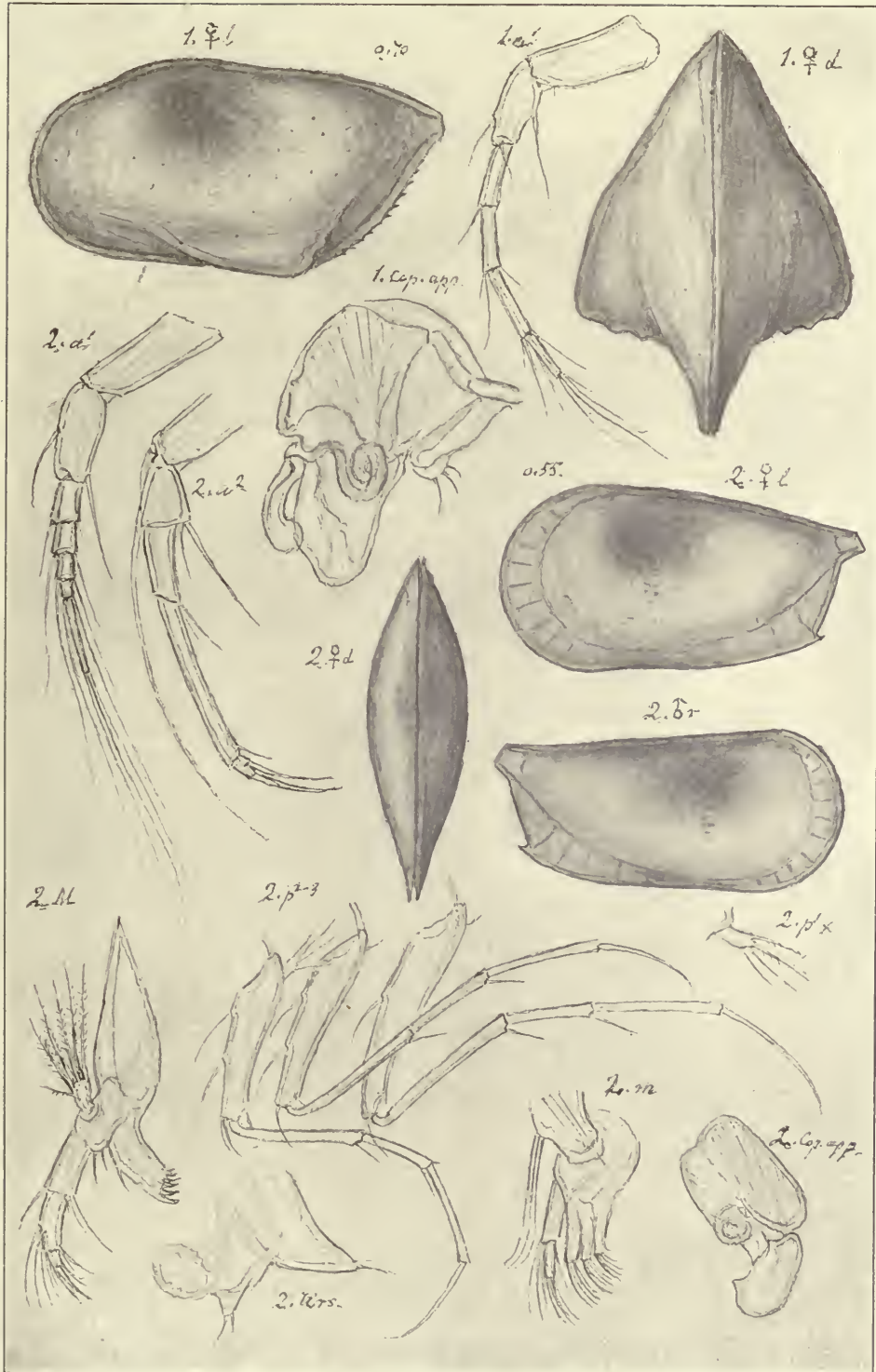


# Ostracoda

Cytheridæ

Podocopa

Pl. CIX



G. O. Sars del.

1. *Bythocythere insignis*, G. O. Sars
2. *Pseudocythere caudata*, G. O. Sars



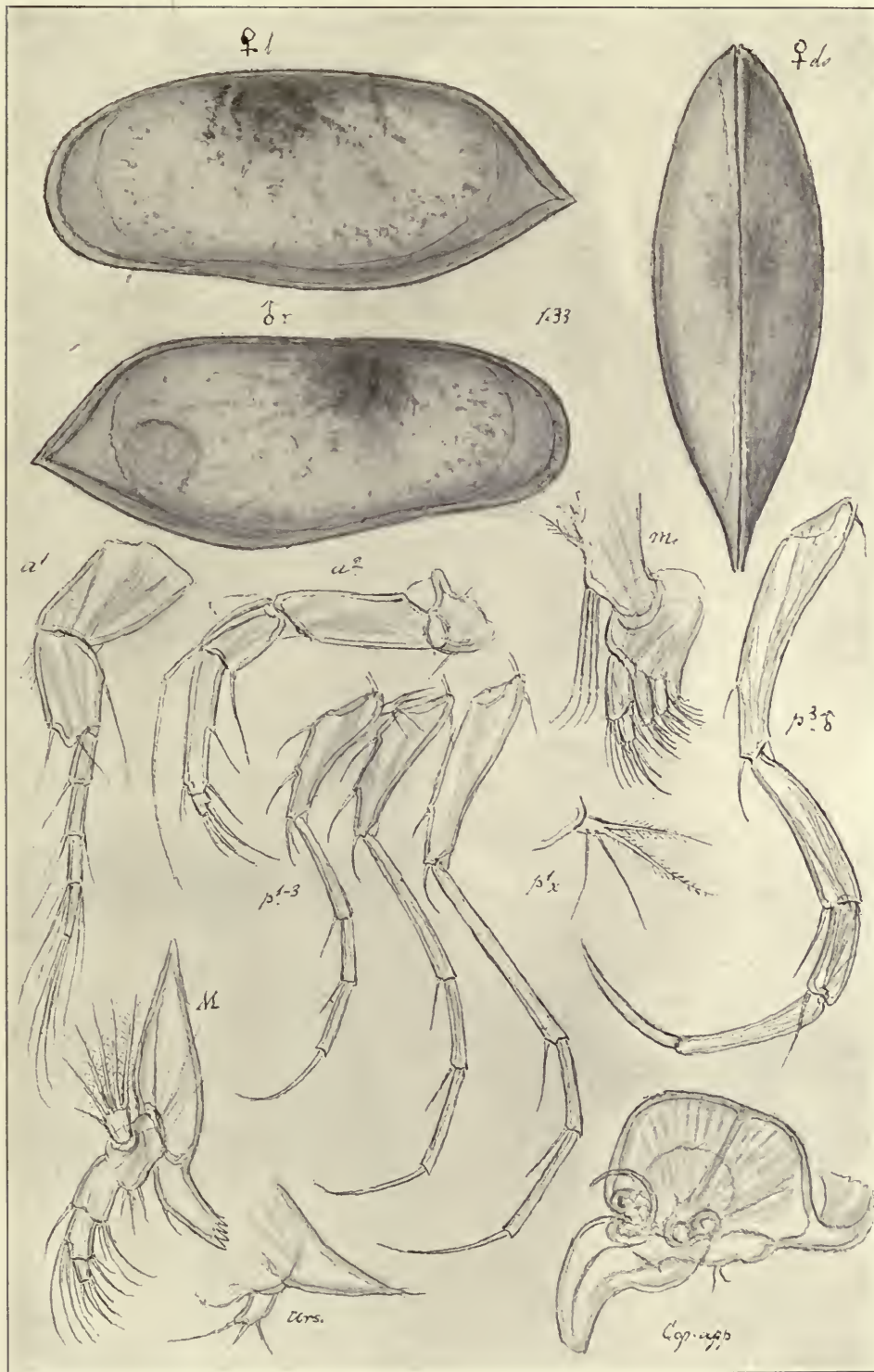


# Ostracoda

Cytheridæ

Podocopa

Pl. CX



G. O. Sars del.

*Macrocythere simplex*, Norman



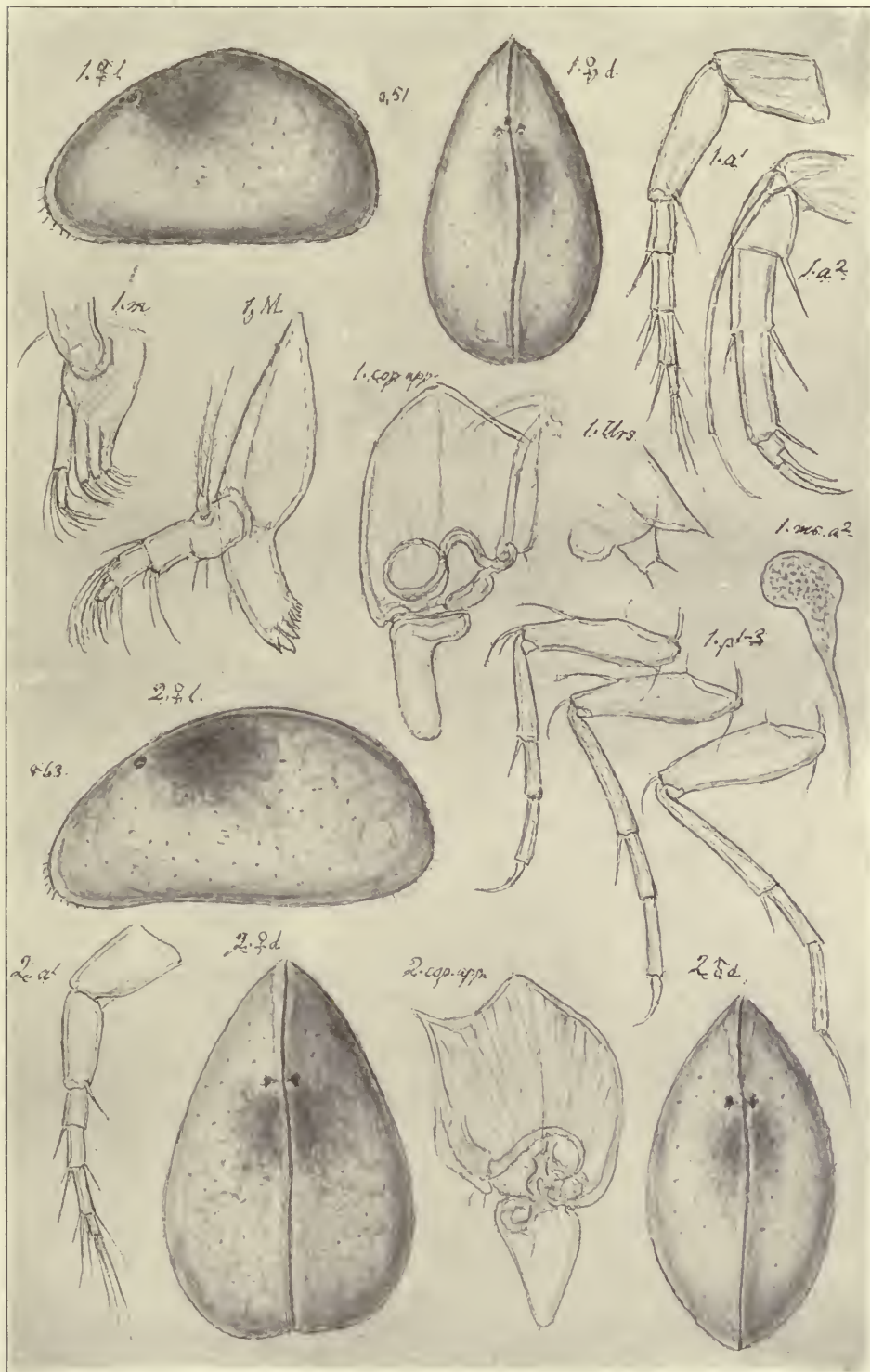


# Ostracoda

Cytheridae

Podocopa

Pl. CXI



G. O. Sars del.

1. *Xestoleberis aurantia*, Baird
2. — *depressa*, G. O. Sars

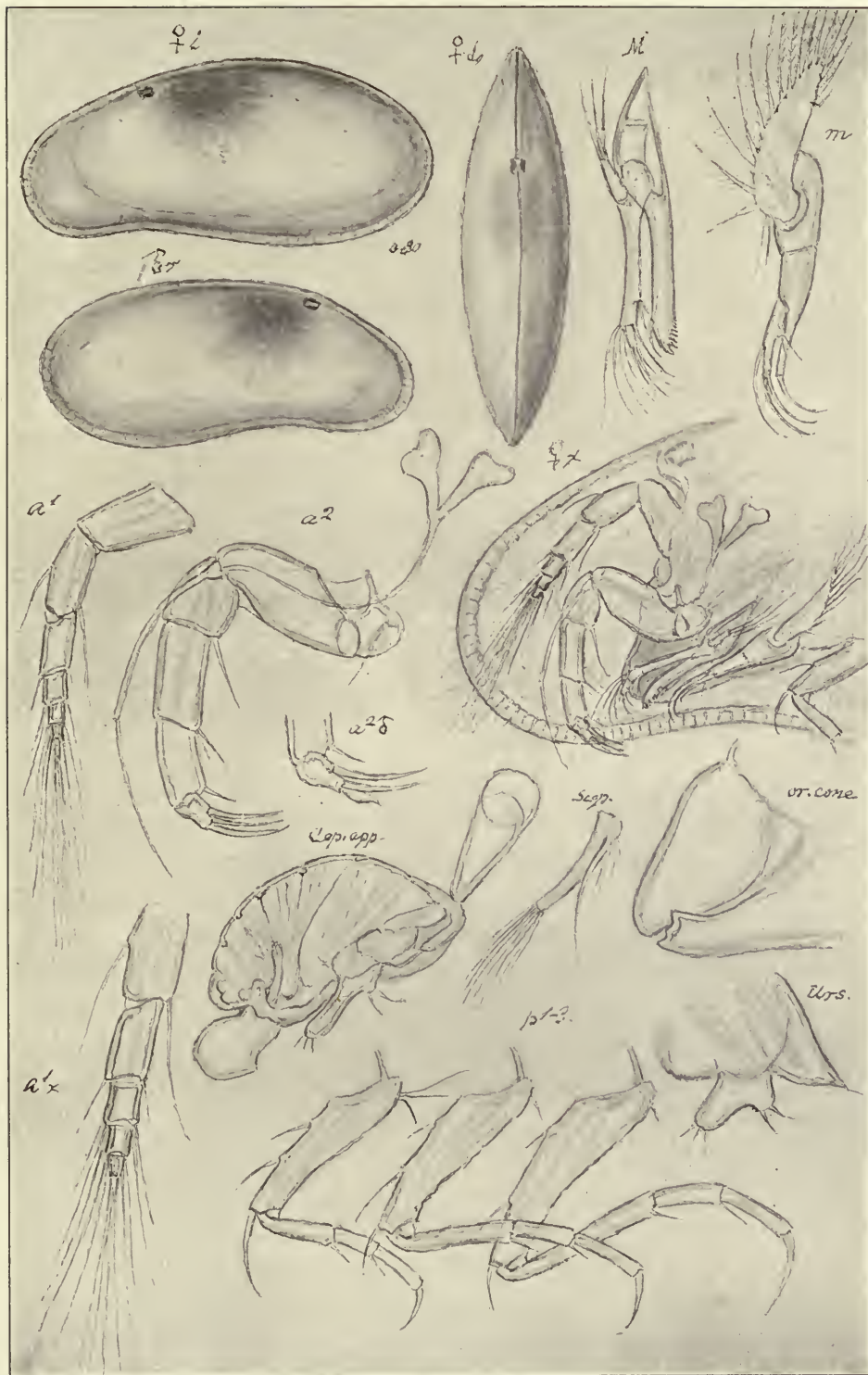


# Ostracoda

Cytheridæ

Podocopa

Pl. CXII



G. O. Sars del.

*Sclerochilus contortus*, Norman





*Remarks.*—This new genus is proposed, to include the large Cytherid originally recorded by Norman under the name of *Cythere simplex* and subsequently described by the present author as a new species of his genus *Bythocythere*. True, this form agrees in most of the structural details rather closely with that genus; but the shell is of a very dissimilar appearance, and I have also found some well-marked differences in the structure of the appendages, making it convenient to discard it as the type of a particular genus. Among these differences it is worthy to name the very conspicuous transformation of the last pair of legs in the male, not found in any other Cytherid known to me.

133. *Macrocythere simplex*, (Norman).

(Pl. CX).

*Cythere simplex*, Norman, Nat. Hist. Trans. Northumb. & Durham, Vol. 1, p. 17, Pl. V, figs. 1—4.

Syn: *Bythocythere acuminata*, G. O. Sars.

*Specific Characters.*—*Female*. Shell, seen laterally, elongate oval in shape, a little higher behind than in front, greatest height not nearly attaining half the length, dorsal margin only very slightly arched and joining the anterior and posterior edges without any intervening angle, ventral margin distinctly sinuated in front of the middle and gently bowed behind, anterior extremity evenly rounded off, posterior gradually contracted to a sharp point located about in the longitudinal axis of the shell;—seen dorsally, narrow oblong in outline, with the greatest width about in the middle and scarcely exceeding  $\frac{1}{3}$  of the length, side-edges evenly curved, anterior extremity obtusely pointed, posterior gradually tapered to a narrow conical prominence. Valves of rather fine consistency, but very pellucid, with the surface perfectly smooth and polished, not exhibiting any obvious sculpture, inner duplicature well defined and rather broad, marginal zone highly chitinated and crossed by numerous fine pore-channels, edges smooth and almost bare of hairs.—Anterior antennæ with the terminal part scarcely longer than the basal one, and clothed with scattered thin setæ. Posterior antennæ with the 1st joint of the terminal part nearly twice as long as broad, middle joint of equal width throughout and provided anteriorly near the end with a well-marked setiferous ledge, apical claws rather slender and successively increasing in length posteriorly. Legs slender, and scarcely differing in structure from those in *Bythocythere*.

*Male* of about same size as female, but differing somewhat in the shape of the shell, which is conspicuously more expanded behind, with the dorsal margin straight or even a little concave in the middle. Last pair of legs very

strongly built; with the joints of the terminal part considerably dilated and provided with powerful muscles, apical claw strong, falciform, and shorter than the preceding joint. Copulative appendages with a distinctly projecting chitinous string inside the basal part, terminal part somewhat nose-shaped, with the posterior edge deeply sinuated and the extremity narrowly rounded.

Colour of shell whitish, semipellucid, and variegated with a few irregularly arborescent pigmentary patches of a light reddish hue.

Length of adult female amounting to 1.33 mm.

*Remarks.*—This is an easily recognisable form, being well distinguished both by the characteristic shape of the shell and by its comparatively large size. It is indeed apparently the largest of all hitherto known Cytheridæ.

*Occurrence.*—I have taken this magnificent Ostracod in many places on the Norwegian coast, from the Oslo Fjord to Lofoten in depths ranging from 20 to 50 fathoms. It is easily detected in the samples examined, both by its large size and by its particularity of remaining floating on the surface of the water, when coming in contact with the air.

*Distribution.*—British Isles, Hunde Islands, Baffin Bay.

*Fossil.*—Scotland, Ireland.

## Subfam. 7. Xestoleberinæ.

*Remarks.*—This subfamily is proposed to include the genus *Xestoleberis* G. O. Sars, which cannot properly find its place within any of the other subfamilies here recorded. Another genus, unquestionably referable to this subfamily, has recently been established by G. W. Müller under the name of *Microxestoleberis*, and I am also of opinion that the peculiar fresh-water genus *Metacypris* Brady ought to be adduced to the same subfamily. In the structure of the several limbs some accordance may be found with the *Cytherinæ*, as above defined; but the shell is of a very dissimilar appearance and in particular distinguished by its encompassing behind a roomy breeding cavity for the reception of the mature ova during their further development. Only the typical genus is represented in the Fauna of Norway.

### Gen. 48. *Xestoleberis*, G. O. Sars, 1865.

*Generic Characters.*—Shell tumid, narrowed in front, with the ventral face distinctly flattened behind. Valves slightly unequal, with the surface smooth



and polished, inner duplicatures moderately broad and very sharply defined behind; hinge line somewhat flexuose. Eyes well developed. Antennæ not much prolonged, the anterior ones with the terminal part 4-articulate and clothed with scattered comparatively short setæ, some of them more or less spiniform. Posterior antennæ without any dividing suture of the penultimate joint, apical claws rather stout and 2 in number, flagellum very coarse with the knee far below. Mandibles coarsely dentate at the end, palp of moderate size, with the vibratory plate comparatively small, bisetose. Maxillæ with the masticatory lobes narrowly produced, palp likewise rather slender, with the distal joint narrow cylindrical in shape, vibratory plate without any deflexed setæ at the base. Legs comparatively short and stout. Caudal lamellæ with 2 short bristles on the tip. Copulative appendages of male well developed, with the terminal part rather narrow, deflexed.

*Remarks.*—This genus was originally founded by the present author on 2 species occurring on the Norwegian coast, one of them having been long ago known and described as a species of the genus *Cythere*. In recent times a great number of species referable to the present genus have been recorded from different parts of the oceans, all of them rather closely allied to the two at first described.

134. *Xestoleberis aurantia*, (Baird).

(Pl. CXI, fig. 1).

*Cythere aurantia*, Baird, British Entomostraca, p. 171, Pl. XXI, fig. 8.

Syn: *Cythere nitida*, Lilljeborg.

„ — *viridis*, Zencker (not O. Fr. Müller).

„ *Xestoleberis nitida*, G. O. Sars.

*Specific Characters.*—*Female.* Shell, seen laterally, subtriangular in shape, greatest height somewhat behind the middle and almost attaining  $\frac{2}{3}$  of the length, dorsal margin considerably arched, forming in the middle an abrupt almost angular bend and sloping rather steeply in front, somewhat less so behind, ventral margin almost straight, anterior extremity narrowly rounded, posterior much broader and somewhat obliquely truncated, with the lower corner slightly produced, but obtusely rounded off at the end;—seen dorsally, rather regularly ovate in outline, with the greatest width behind the middle and almost attaining  $\frac{3}{5}$  of the length, anterior extremity gradually contracted to an obtuse point, posterior rounded off at the end.—Valves moderately firm and semipellucid, with the surface smooth and shining, being only marked by scattered very small knobs, marginal zone narrow and crossed by distinctly

marked porechannels, edges clothed with fine hairs. Eyes well separated; immediately in front of them a rather conspicuous dark pigmentary spot.—Anterior antennæ with the distal segment of the basal part oblong in shape, gradually tapered towards the end and provided with a short seta at the infero-posteal corner; terminal part only slightly attenuated, with the last joint rather small, each of the 3 preceding joints with a rather stout spiniform seta anteriorly. Posterior antennæ comparatively strongly built, with the anterior setiferous ledge of the penultimate joint placed opposite to the posterior ledge at about the middle of the joint; vesicle leading to the flagellum unusually large, club-shaped. Legs not much differing in size, last pair with the 1st joint of the terminal part about the length of the other 2 combined.

*Male* a little smaller than female, and having the shell comparatively less tumid, with the infero-posteal corner somewhat more projecting. Copulative appendages with a well-defined spirally curled string inside the basal part, terminal part narrow linguiform in shape.

Colour of shell more or less dark brownish orange.

Length of adult female but little exceeding half a millimeter.

*Remarks.*—This form was recorded as early as the year 1858 by Baird as a species of the genus *Cythere* and was subsequently described under 2 other specific names, viz., by Lilljeborg as *C. nitida* and by Zencker as *C. viridis*, being erroneously identified with the so named species of O. Fr. Müller. It is the type of the present genus.

*Occurrence.*—The present Ostracod is a strictly littoral form, being found rather frequently along our whole coast close to the beach among algæ, and often left in tidal pools together with other littoral animals.

*Distribution.*—British Isles, Kattegat, Baltic, Holland, Franklin Pierce Bay.

*Fossil.*—Norway, Scotland, Ireland.

### 135. *Xestoleberis depressa*, G. O. Sars.

(Pl. CXI, fig. 2).

*Xestoleberis depressa*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 68.

*Specific Characters.*—*Female.*—Shell exceedingly tumid, with the posterior part distinctly depressed, seen laterally almost semilunar in shape, greatest height but little exceeding half the length, dorsal margin forming a rather even arch quite continuous with both the anterior and posterior edges, ventral margin slightly sinuated in front of the middle, anterior extremity considerably tapered and distinctly deflexed, almost beak-shaped, though rounded at the



end, posterior more obtuse and somewhat obliquely deflexed;—seen dorsally, broadly ovate in outline, with the greatest width quite behind and considerably exceeding the height, anterior extremity gradually tapered to an obtuse point, posterior broadly rounded off and somewhat emarginate in the middle. Valves rather transparent, with the surface smooth and of a pearly lustre, but marked with scattered small knobs. Eyes well developed; but no pigmentary spot in front of them observable. Anterior antennæ with the terminal part comparatively narrower than in the preceding species, none of the setæ spiniform. Posterior antennæ differing from those in the said species except by the apical claws being somewhat more slender; vesicle leading to the flagellum much smaller. Last pair of legs with the 1st joint of the terminal part somewhat longer than the other 2 combined.

*Male* of somewhat smaller size than female and having the shell much less tumid, seen dorsally, regularly oval in outline, with the greatest width in the middle and the extremities almost equally contracted. Copulative appendages with the terminal part triangular in shape.

Colour of shell pearly white, transparent, with a somewhat ramified reddish brown patch dorsally behind the ocular region; breeding cavity of female generally filled with numerous developing ova and embryos distinctly traced through the pellucid shell.

Length of adult female 0.64 mm.

*Remarks.*—The above-described form is easily recognised from the preceding one by the much more tumid shell, the posterior part of which is distinctly depressed behind in the female; hence the specific name proposed. It is also of rather larger size and much more transparent.

*Occurrence.*—I have taken this form not unfrequently in several places on the Norwegian coast, from the Oslo Fjord to Lofoten, but only in somewhat greater deeps, in the Laminarian region.

*Distribution.*—British Isles, Spitzbergen, Greenland, Davis Strait, Gulf of St. Lawrence, Bay of Biscay, Mediterranean, Kerguelen.

*Fossil.*—Norway, Scotland, Ireland, Holland, Canada, Calabria.

## Subfam. 8. Paradoxostominæ.

*Remarks.*—This subfamily is here taken in a somewhat wider sense than generally admitted, the genus *Sclerochilus* G. O. Sars, being included within it, because I have found that this genus in some regards presents an evident



approach to the other members referred to that subfamily. True, the oral cone is not terminated in a sucking disk, like that found in the typical genus *Paradoxostoma*; but in another genus, *Paracytherois*, recently established by G. W. Müller and unquestionably belonging to the present subfamily, there is likewise no trace of any sucking disk on the oral cone; and the presence of such a disk cannot of course be regarded as an exclusive character of the subfamily *Paradoxostominæ*. 4 genera referable to the present subfamily will be treated of in the sequel. A 5th apparently distinct genus, *Machairina* (*Xiphochilus*) Brady, may be here named; but this genus is as yet only known, as regards the shell.

#### Gen. 49. **Sclerochilus**, G. O. Sars, 1865.

*Generic Characters*.—Shell compressed, more or less elongate in shape, and of rather firm consistency, with the marginal zone highly chitinised. Surface of valves smooth, without any obvious sculpture. Hinge imperfect. Eyes coalesced. Anterior antennæ with the terminal part 5-articulate and clothed with long and slender setæ, forming a dense apical fascicle. Posterior antennæ robust, with the penultimate joint distinctly subdivided, but without any setiferous ledge in front, apical claws 3 in number, one of them reduced in male; flagellum slender, with the knee about in the middle, vesicle leading to it large, bifurcate. Oral cone projected obliquely forwards and obtuse at the tip, with the 2 lips well defined. Mandibles with the masticatory part narrowly produced and scarcely at all incurved, cutting edge very oblique and finely denticulated, palp slender and imperfectly jointed, with the vibratory plate narrow, trisetose. Maxillæ with the basal part rather prolonged and apparently composed of 2 distinct segments, the distal one conically tapered, terminal part rather defective, only exhibiting a single narrow, unisetose masticatory lobe inside the palp, the latter indistinctly jointed, with 2 curved apical setæ; vibratory plate narrow lanceolate in shape, with 2 or 3 thin deflexed setæ at the base. Legs comparatively short and stout, with each of the first 2 joints of the terminal part provided with a short spine at the end anteriorly. Caudal lamellæ divided into 2 rounded lobes, the anterior one trisetose, the posterior bisetose. Copulative appendages of male with the terminal part rather small, lamelliform.

*Remarks*.—This genus is considered by G. W. Müller to be a very primitive type, and it is on that reason treated of at the very head of the *Cytheridæ*. I am not prepared to assent in this view. In my opinion it is on the contrary considerably diverging from the usual Cytherid type, especially

as regards the structure of the oral parts, and it is therefore included here within the last and most anomalous of the 8 subfamilies in which the Cytheridæ have been subdivided in the present Account. In addition to the typical form described below, 6 other species, referable to this genus, have been recorded by G. W. Müller, 3 of them from the Antarctic Ocean, the other 3 from the Gulf of Naples.

136. *Sclerochilus contortus*, (Norman).

(Pl. CXII).

*Cythere contorta*, Norman, Ann. Mag. Nat. Hist. Vol. IX, p. 48, Pl. II, fig. 15.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong bean-shaped somewhat higher behind than in front, greatest height not nearly attaining half the length, dorsal margin forming a gentle and quite even arch continuous with both the anterior and posterior edges, ventral margin deeply sinuated in front of the middle and gently convex behind, anterior extremity evenly rounded off at the end, posterior obtuse, with no trace of a corner below;—seen dorsally, very narrow oblong, with the greatest width not even attaining  $\frac{1}{3}$  of the length, both extremities pointed and nearly equal. Valves semi-pellucid, with the surface glabrous, inner duplicatures rather broad in front and also well marked along the ventral face, marginal zone however comparatively narrow throughout and crossed by numerous short pore-channels, edges clothed with fine hairs. Eye easily observable in the living animal, but very soon vanishing in preserved specimens. Anterior antennæ with the distal segment of the basal part only slightly dilated, and provided with 2 slender setæ, one in the middle of the anterior edge, the other at the infero-posteal corner, terminal part scarcely as long as the basal one, with the 1st joint much larger than the other 3, which rapidly diminish in size, the last carrying on the tip several extremely thin and slender setæ partly connected at the base, so as to present the appearance of a spurious apical joint. Posterior antennæ very robust, with the dividing suture of the penultimate joint located somewhat below the middle, vesicle leading to the flagellum with each of the lappets slightly bilobular at the end. 1st pair of legs with only a single curved spine at the end of the basal joint, but with 3 juxtaposed delicate setæ at the infero-posteal corner.

*Male* of rather smaller size than female, but only slightly differing in the general shape of the shell. Copulative appendages with the basal part obliquely oval in shape, terminal part defined from the basal one in front by a



deep incision and somewhat widening distally, with the extremity rounded off and slightly angular behind. Caudal lamellæ well observable immediately below the copulative appendages, and notably differing from those in female by the great size of the anterior lobe.

Colour of shell whitish, semipellucid, with a dark patch dorsally behind the ocular region.

Length of adult female 0.80 mm.

*Remarks.*—This form was recorded as early as the year 1862 by Norman as a species of *Cythere*, and was subsequently described by the present author as the type of his genus *Sclerochilus*. The form recorded by G. W. Müller under that name from the Gulf of Naples is a different species, viz., *S. abbreviatus*, Brady.

*Occurrence.*—I have taken this form not unfrequently in several places on the Norwegian coast, from the Oslo Fjord to Finmark, in depths ranging from 10 to 30 fathoms.

*Distribution.*—British Isles, Arctic Ocean: Greenland, Spitzbergen, Franz Joseph Land.

*Fossil.*—Norway, Scotland, Ireland, Canada.

## Gen. 50. **Paracytherois**, G. W. Müller, 1894.

*Generic Characters.*—Shell thin and fragile, much compressed, and of more or less elongate shape, with the marginal zone of the valves comparatively broad and crossed by distant somewhat irregular pore-channels. Hinge-line of right valve with traces of closing teeth in front and behind. Eyes wholly absent. Anterior antennæ very narrow, with the segments of the basal part not at all dilated, terminal part only composed of 3 joints clothed with scattered comparatively short setæ. Posterior antennæ with the penultimate joint distinctly subdivided and provided with a small setiferous ledge anteriorly, last joint with a single apical claw accompanied by a small bristle. Oral cone projected almost straight forwards and terminating in an acute beak-like point, lips partly coalesced. Mandibles simple styliform, in some cases projecting long beyond the oral aperture, palp rudimentary. Maxillæ with 2 very narrow masticatory lobes, palp shorter than these lobes, vibratory plate with 2 thin deflexed setæ at the base. Legs rather narrow, with the last joint considerably prolonged. Caudal lamellæ very small, with only a single bristle at the base. Copulative appendages of male with the terminal part more or less imperfect.



*Remarks.*—This genus has been established by G. W. Müller, to include 5 species found by him in the Gulf of Naples, and was chiefly characterised by the peculiar beak-like appearance of the oral cone and by the great reduction of the mandibles. On the closer examination of the forms of the present subfamily found off the Norwegian coast, I have been enabled to state, that some northern species hitherto recorded by Brady as members of the genus *Paradoxostoma*, in reality are referable to the present genus. 3 such species will be described in the sequel.

137. *Paracytherois arcuata*, (Brady).

(Pl. CXIII, fig. 1).

*Paradoxostoma arcuatum*, Brady, Mon. Brit. Ostracoda, p. 461, Pl. XXXV, figs. 37, 38.

Syn: *Paracytherois rara*, G. W. Müller.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong bean-shaped, not unlike that of *Sclerochilus contortus*, greatest height somewhat behind the middle and not nearly attaining half the length, dorsal margin forming a rather even arch sloping somewhat more steeply behind than in front, ventral margin rather deeply sinuated in front of the middle and gently convex behind, anterior extremity somewhat deflexed and evenly rounded off at the end, posterior terminating below in an obtuse corner;—seen dorsally, very narrow, lancet-shaped, with the greatest width not even attaining  $\frac{1}{4}$  of the length; both extremities sharply pointed, the anterior somewhat narrower than the posterior.—Valves thin and pellucid, with the surface smooth and polished, marginal zone well marked and rather broad along the ventral face, pore-channels very few in number, but easily observable.—Anterior antennæ with the distal segment of the basal part long and narrow, almost cylindrical in shape, and without any setæ; terminal part scarcely longer than this segment, with the joints very unequal in size. Posterior antennæ with the dividing suture of the penultimate joint located about in the middle. Legs not much prolonged, last pair with the 1st joint of the terminal part considerably shorter than the other 2 combined.

*Male* resembling the female both in size and in the general shape of the shell. Copulative appendages with the basal part obpyriform in outline, terminal part consisting of 2 subequal curved spines.

Colour of shell whitish, pellucid.

Length of adult female 0.55 mm.

*Remarks.*—The above-described form agrees pretty well with the description and figures given by Brady of his *Paradoxostoma arcuatum*, and I am

also of opinion, that the form recorded by G. W. Müller from the Gulf of Naples under the name of *Paracytherois rara* is the very same species. It ought to be considered as the type of the present genus.

*Occurrence*.—Several specimens of this form have been taken, long ago, off the west coast of Norway, from deep water among Hydroidæ, but were only quite recently identified.

*Distribution*.—British Isles, Mediterranean.

*Fossil*.—Scotland.

### 138. *Paracytherois flexuosa*, (Brady).

(Pl. CXIII, fig. 2).

*Paradoxostoma flexuosum*, Brady, Mon. Brit. Ostracoda, p. 461, Pl. XXXV, figs. 30–34.

Syn: *Paracytherois striata*, G. W. Müller.

*Specific Characters*.—*Female*. Shell, seen laterally, of a very narrow and peculiar flexuous shape, distinctly attenuated both behind and in front, greatest height about in the middle and scarcely exceeding  $\frac{1}{3}$  of the length, dorsal margin forming a strong and quite even arch sloping rather steeply towards the anterior extremity, ventral margin distinctly sinuated in front of the middle and gently bowed behind, anterior extremity narrowly produced below, almost beak-shaped, though rounded off at the end, posterior somewhat exerted and narrow obtuse;—seen dorsally, lancet-shaped, with the greatest width not nearly attaining  $\frac{1}{4}$  of the length, both extremities sharply pointed and nearly equal. Valves very thin and transparent, with the surface smooth and polished, though on a closer examination exhibiting traces of an extremely fine longitudinal striation, marginal area rather narrow in front, but considerably widening along the ventral face.—Structure of the several appendages only very little different from that in the preceding species.

Colour of shell whitish pellucid.

Length of adult female 0.60 mm.

*Male* not observed.

*Remarks*.—The present species is nearly allied to the preceding one, but is easily distinguished by the characteristic shape of the shell, as seen laterally. It seems to me evident, that the form recorded by G. W. Müller from the Gulf of Naples under the name of *P. striata* is the same species.

*Occurrence*.—A few female specimens of this form were found together with the preceding species, the exact locality not being ascertained.

*Distribution*.—British Isles, Holland, Fosse de Cap Breton, Bay of Biscay, Mediterranean.



139. *Paracytherois producta*, (Brady & Norm.).

(Pl. CXIII, fig. 3).

*Paradoxostoma productum*, Brady & Norman, Mon. recent Ostracoda 1889, p. 236,  
Pl. XXI, figs. 9, 10.Syn: *Paracytherois oblonga*, G. W. Müller.

*Specific Characters.*—*Male*. Shell, seen laterally, very narrow oblong in shape, greatest height scarcely exceeding  $\frac{1}{3}$  of the length, dorsal margin only slightly arched and sloping somewhat more steeply behind than in front, ventral margin distinctly sinuated in front of the middle and gently convex behind, anterior extremity rather broad and remarkably bowed below, being obliquely blunted at the end, posterior gradually tapered to a narrowly obtuse corner located below the longitudinal axis of the shell;—seen dorsally, narrow fusi-form or lancet-shaped, with the greatest width about equal to  $\frac{1}{4}$  of the length, both extremities sharply pointed and nearly equal.—Valves very thin and pellucid, with the marginal zone comparatively broad and crossed by very distinctly marked pore-channels rather irregularly arranged in front.—Anterior antennæ comparatively more strongly built than in the 2 preceding species, but of a very similar structure. Posterior antennæ, on the other hand, rather more slender, with the penultimate joint very narrow and having the dividing suture located above the middle. Oral cone very sharply pointed at the extremity and somewhat deflexed. Copulative appendages comparatively small, with the terminal part undivided in the form of a curved beak-like lamella.

*Female* of somewhat smaller size than male, and having the shell comparatively shorter, with the dorsal face more vaulted.

Colour of shell not yet ascertained.

Length of adult male 0.45 mm.

*Remarks.*—This is a very small species, and is moreover easily recognised from the 2 preceding ones by the rather different shape of the shell. The form recorded by G. W. Müller from the Gulf of Naples under the name of *P. oblonga* is unquestionably identical with the present species.

*Occurrence.*—I have not myself taken this form; but Norman sent me some specimens taken by him recently in the Bergen Fjord and mounted dry on a slide. By moistening the shells, I succeeded in finding in one of them the limbs tolerably well preserved, to allow of a detailed examination, and I have therefore thought it right to describe the species here along with the other 2 found by myself.

*Distribution.*—As yet only found off the west coast of Norway.



Gen. 51. **Cytherois**, G. W. Müller, 1884.

*Generic Characters*.—Shell, as a rule, less compressed than in the preceding genus, but rather thin and fragile, of more or less elongate shape, with the inner duplicatures rather broad, marginal zone however very narrow throughout. A single well-developed eye always present. Anterior antennæ with the distal segment of the basal part narrow cylindrical in shape, terminal part longer than this segment and composed of 3 joints. Posterior antennæ comparatively robust with the penultimate joint distinctly subdivided, but without any setiferous ledge in front, last joint with a single apical claw accompanied behind by a very small bristle. Oral cone rather massive and directed downwards, terminating in a somewhat imperfect sucking disk. Mandibles very strongly built and highly chitinated, with the masticatory part not at all incurved and gradually tapered to a blunt point exhibiting inside slight traces of cutting teeth; palp slender and of rather feeble consistency, with the proximal joints wholly coalesced, terminal joint falciform curved and densely setiferous, vibratory plate rudimentary. Maxillæ provided at the end with 4 densely crowded narrow digitiform lobes, the outermost one representing the palp; vibratory plate comparatively short, with 2 deflexed setæ at the base. Legs rather thin and of moderate length. Caudal lamellæ very small, with one or 2 short bristles. Copulative appendages of male with the basal part large and expanded, terminal part however comparatively poorly developed, lamelliform.

*Remarks*.—This genus, established in the year 1884 by G. W. Müller, is nearly allied to *Paradoxostoma*, to which its species had indeed formerly been referred, but differs very notably in the powerful development of the mandibles and in the somewhat incomplete sucking disk on the extremity of the oral cone. 3 species referable to this genus will be described in the sequel.

140. **Cytherois Fischeri**, G. O. Sars.

(Pl. CXIV).

*Paradoxostoma Fischeri*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 96.Syn: *Cytherois virens*, G. W. Müller.

*Specific Characters*.—*Female*. Shell, seen laterally, oblong subtriangular in shape, scarcely higher behind than in front, greatest height in the middle and nearly equal to half the length, dorsal margin boldly arched, almost angularly bent in the middle, and sloping rather steeply both in front and

behind, ventral margin almost straight or very faintly sinuated in front of the middle, both extremities narrowly rounded off at the end;—seen dorsally, oblong oval in outline, with the greatest width in the middle and about equal to  $\frac{2}{5}$  of the length, both extremities obtusely pointed. Surface of valves smooth and glabrous, only marked with scattered small puncta, edges very finely hairy. Eye well observable in the living animal, but, as usual, vanishing in preserved specimens. Anterior antennæ moderately slender, with the middle joint of the terminal part scarcely longer than the 1st, last joint very narrow and prolonged. Posterior antennæ comparatively short and stout, with the dividing suture of penultimate joint located near the end, apical claw rather slender. 1st pair of legs considerably smaller than the other 2, which are nearly of equal length. Caudal lamellæ much reduced, with only a single small bristle at the posterior corner.

*Male* of rather larger size than female, and having the shell comparatively more elongate. Copulative appendages with the basal part broadly subquadrangular in shape, terminal part projected forwards, and pronouncedly boot-shaped, being considerably constricted at the base and expanded distally.

Colour of shell light yellowish, with a broad band of a dark olivaceous hue across the middle, each extremity more or less distinctly tinged with the same colour.

Length of adult female 0.50 mm., of male 0.58 mm.

*Remarks.*—This form was first described by the present author as a species of the genus *Paradoxostoma*, and was subsequently recorded by G. W. Müller as the type of his genus *Cytherois*, though under a different specific name (*virens*). It is readily distinguished from the other 2 species here described by the shape and colour of the shell.

*Occurrence.*—I have taken this form rather abundantly in the upper part of the Oslo Fjord, as also in several other places on the Norwegian coast. It is a strictly littoral form, being found close to the beach among algæ, and not seldom left in tidal pools together with other littoral animals.

*Distribution.*—British Isles, Pommerania, Mediterranean.

*Fossil.*—Scotland, Ireland.

#### 141. *Cytherois vitrea*, G. O. Sars.

(Pl. CXV, fig. 1).

*Paradoxostoma vitreum*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 95.

*Specific Characters.*—*Female.* Shell, seen laterally, oblong in shape, more tapered in front than behind, greatest height rather behind the middle and not nearly attaining half the length, dorsal margin well arched behind and



sloping gradually anteriorly, ventral margin almost straight, or very slightly concave in front of the middle, anterior extremity rather narrow and somewhat angular, at the end, posterior much broader and obtusely truncated;—seen dorsally, narrow oblong in outline, with the greatest width about equal to  $\frac{1}{4}$  of the length, anterior extremity more pointed than the posterior. Valves thin and highly transparent, with the surface smooth and shining. Eye large and very conspicuous in the living animal.—Anterior antennæ exceedingly thin and slender, with the middle joint of the terminal part more than twice as long as the 1st, last joint however very small. Posterior antennæ much more robust, with the distal segment of the basal part rather prolonged, dividing suture of penultimate joint located about in the middle, apical claw comparatively short. Mandibles of a similar coarse structure to that in the type species, palp however rather thinner and more prolonged. Maxillæ with the terminal digitiform lobes very narrow and prolonged. Legs about as in the preceding species. Caudal lamellæ with 2 distant bristles on the edge.

*Male* of considerably larger size than female, and having the shell conspicuously more elongate in shape. Copulative appendages with the basal part rather expanded and irregularly rounded in outline; terminal part securiform in shape, with the posterior corner narrowly produced.

Shell nearly colourless and highly transparent.

Length of adult female 0.52 mm., of male 0.60 mm.

*Remarks.*—The present species is easily recognised from the preceding one by the somewhat different shape of the shell, as also by the wholly absence of any pigmentary patches on the valves, which are so highly transparent that the enclosed body appears rather clearly through their walls; hence the specific name proposed. Some well-marked differences are also found in the structure of the appendages, as shown by the above given diagnosis.

*Occurrence.*—I have met with this species in several places on the Norwegian coast, from the Oslo Fjord to Lofoten. It is only found in greater depths ranging from 20 to 50 fathoms, never, as the typical species, in the littoral zone.

*Distribution.*—Shetland, Faroe Islands.

142. *Cytherois pusilla*, G. O. Sars, n. sp.

(Pl. CXV, fig. 2).

*Specific Characters.*—*Female.* Shell, seen laterally of a shape somewhat similar to that in *C. vitrea*, though comparatively rather narrower, with the greatest height scarcely exceeding  $\frac{2}{5}$  of the length, dorsal margin rather evenly



arched throughout, ventral almost straight, anterior extremity narrowly produced, posterior somewhat broader and obliquely rounded off;—seen dorsally, very narrow, oblong in outline, with the side-edges almost straight in the middle and both extremities obtusely pointed.—Valves less transparent than in *C. vitrea*, but with the surface perfectly smooth and polished. Eye well observable in the living animal. Anterior antennæ comparatively less slender than in the said species, but of a rather similar structure, though the mutual relation of the joints is a little different. Posterior antennæ with the dividing suture of penultimate joint located near the extremity, apical claw rather slender. Legs rapidly increasing in length posteriorly, last pair considerably more strongly built than the other 2, with the joints of the terminal part distinctly ciliated along the anterior edge.

*Male*, unlike the case with the 2 preceding species, of smaller size than female, and very little differing in the shape of the shell. Copulative appendages with a rather conspicuous thickish curved prominence in front; terminal part very small, irregularly oval in shape, and pointing straight downwards.

*Remarks*.—In the general shape of the shell this form bears some resemblance to *C. vitrea*; but the structure of the several appendages seems to be more in accordance with that in *C. Fischeri*. It is however of much smaller size than either of these 2 species, and differs also conspicuously in colour.

*Occurrence*.—Several specimens of this small species were collected, many years ago, at Skutesnæs, southwest coast of Norway, in rather shallow water among algæ, and I have also met with it occasionally in some other places on our coast.

*Distribution*.—As yet only known from Norway.

## Gen. 52. **Paradoxostoma**, Fischer, 1855.

*Generic Characters*.—Shell thin and fragile, of somewhat different shape in the several species, but, as a rule, higher behind than in front, inner duplicatures of valves less broad than in the preceding genera, marginal zone very narrow, with only slight traces of pore-channels. A single well-developed eye present. Anterior antennæ slender and narrow, but with the distal segment of the basal part less prolonged than in the 2 preceding genera; terminal part composed of 4 well defined joints clothed with scattered rather short setæ, the last 2 joints much smaller than the preceding ones. Posterior antennæ with the penultimate joint distinctly subdivided and provided in front with a small

setiferous ledge, last joint with 2 unequal claws, flagellum very coarse. Oral cone of a similar appearance to that in *Cytherois*, but with the sucking disk completely closed. Mandibles thin, styliform, terminating in a sharp point, palp very narrow and imperfectly jointed. Maxillæ provided at the extremity with 3 masticatory lobes, the innermost much smaller than the other 2, palp rudimentary or quite wanting, vibratory plate with 2 partly connected thin deflexed setæ at the base. Legs narrow and rapidly increasing in length posteriorly, with the terminal joint, as a rule, very slender and in the last pair distinctly ciliated along the anterior edge, apical claws comparatively short and stout. Caudal lamellæ very small, with a recurved bristle in front. Ripe ova received in the cavity of the shell for further development. Copulative appendages of male with the basal part large and expanded, sending off below a thin lamella, terminal part poorly developed and more or less spiniform in shape.

*Remarks.*—This genus was established in the year 1855 by Fischer, to include a Cytherid (*P. dispar*) observed by him at Madeira, and was chiefly characterised by the suctorial nature of the mouth. Many other forms, apparently agreeing in this respect with Fischer's species, were subsequently detected and referred to the same genus. Yet, as above mentioned, G. W. Müller has pointed out certain well-marked differences of the mouth-organs in some of these species, inducing him to the establishment of the 2 new genera *Cytherois* and *Paracytherois* treated of in the preceding pages. There still remains however a rather considerable number of forms unquestionably referable to the present genus in the restriction here adopted, both from the northern Ocean and from more southern latitudes. In the following pages 7 species, as yet observed off the Norwegian coast, will be described.

#### 143. *Paradoxostoma variabile*, (Baird).

(Pl. CXVI).

*Cythere variabilis*, Baird, British Entomostraca, p. 170, Pl. XXI, figs. 10, 11.

*Specific Characters.*—*Female.* Shell, seen laterally, oval subcuneiform in shape, rather high behind and gradually narrowed in front, greatest height nearly equal to half the length, dorsal margin well arched behind and sloping slowly anteriorly, ventral margin scarcely at all sinuated, being conspicuously bowed in its posterior part, anterior extremity narrowly produced, posterior much broader and obliquely rounded, with a slight indication to an angle above;—seen dorsally, oblong oval in outline, with the greatest width in the middle and somewhat exceeding  $\frac{1}{3}$  of the length, both extremities obtusely



pointed. Valves semipellucid, with the surface very smooth and polished, wanting any obvious sculpture, edges almost bare of hairs, but bordered with a narrow hyaline rim. Eye rather large and well conspicuous in fresh specimens: Anterior antennæ moderately slender, with the 2nd joint of the terminal part slightly longer than the 1st, the last 2 joints combined exceeding half the length of this joint. Posterior antennæ with the dividing suture of penultimate joint located about in the middle, apical claws very short; vesicle leading to the flagellum rather large, clavate in shape. Mandibular palp not much prolonged, with the terminal joint comparatively short. Maxillæ without any trace of a palp. Legs rather slender, but with the apical claw comparatively short and stout.

*Male* of rather larger size than the female, with the shell comparatively more elongate in shape. Copulative appendages coarsely developed, with the basal part very large and expanded; terminal part represented by 2 diverging pieces, the anterior one spiniform and slightly tortuous, the posterior somewhat larger and lamelliform, terminating behind in an acute corner.

Colour of shell somewhat variable, but more frequently light yellowish or whitish, with 2 sharply defined patches of a dark violaceous or almost black hue on each side, the one about in the middle, the other near the posterior extremity, a 3rd less sharply defined patch being moreover generally present in the oral region of the shell.

Length of adult female amounting to 0.60 mm., of male to 0.68 mm.

*Remarks.*—The present species, being that recorded at the earliest date, ought of course to be regarded as the type of the genus *Paradoxostoma*. It is easily recognised from the other known species by the characteristic cuneiform shape of the shell, as seen laterally, and also partly by the colour.

*Occurrence.*—This is one of our commonest Cytheridæ, occurring very abundantly along the whole of the Norwegian coast in the littoral zone among algæ, and often left in tidal pools together with other littoral animals.

*Distribution.*—British Isles, Holland, Arctic Ocean: Baffin Bay, Hunde Island, Spitzbergen.

*Fossil.*—Norway, Scotland, Ireland, Canada.



144. *Paradoxostoma ensiforme*, Brady.

(Pl. CXVII, fig. 1).

*Paradoxostoma ensiforme*, Brady, Mon. British Ostracoda, p. 460, Pl. XXXV, figs. 8—11.Syn: *Paradoxostoma angustum*, G. W. Müller.

*Specific Characters.*—*Female.* Shell rather elongate, seen laterally almost ensiform in shape, with the greatest height not nearly attaining half the length, dorsal margin somewhat abruptly arched behind the middle and sloping at a nearly straight course to the tip of the hind extremity, ventral margin slightly sinuated in front of the middle and evenly bowed behind, anterior extremity narrowly produced, posterior terminating in a well-marked obtuse corner located about in the longitudinal axis of the shell;—seen dorsally, narrow oblong in outline, with the greatest width in the middle and about equal to  $\frac{1}{3}$  of the length, side-edges somewhat irregularly curved, anterior extremity more contracted than the posterior. Valves rather thin and pellucid, with the surface very smooth and polished, inner duplicatures comparatively narrower than in the type species.—Anterior antennæ considerably prolonged, with the 1st joint of the terminal part fully as long as the distal segment of the basal one and somewhat exceeding the length of the 2nd joint, last 2 joints however rather small and combined not nearly attaining half the length of the preceding one. Posterior antennæ comparatively slender, with the dividing suture of the penultimate joint located somewhat above the middle, principal apical claw much more prolonged than in the type species. Legs resembling in structure those in that species, though having the apical claw more slender.

*Male* slightly smaller than female, but very little differing in the shape of the shell. Copulative appendages far less strongly built than in the preceding species and rather dissimilar in shape, basal part subtriangular in shape and provided at the end in front with a small slightly bilobular prominence and below with a rather large somewhat curved lamella; terminal part narrow spiniform and doubled upon the said lamella so as forming together with it a sort of pincers.

Colour of shell not yet ascertained.

Length of adult female 0.74 mm.

*Remarks.*—The present species bears some resemblance in its general appearance to *P. variabile*, but is, on a closer comparison, easily distinguished by the much more elongate shell, which seen laterally, exhibits a somewhat ensiform shape; hence the specific name proposed by Brady. The form

recorded by G. W. Müller from the Gulf of Naples under the name of *P. angustum* is unquestionably the same species.

*Occurrence*.—Some few specimens of this form were found in the material of *P. variabile* collected in various places of the Norwegian coast. Norman has recorded it from Lervik, in the outer part of the Hardanger Fjord.

*Distribution*.—British Isles.

#### 145. *Paradoxostoma obliquum*, G. O. Sars.

(Pl. CXVII, fig. 2).

*Paradoxostoma obliquum*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 97.

*Specific Characters*.—*Female*. Shell, seen laterally, irregularly oval or somewhat rhomboid in shape, greatest height in the middle and about equaling half the length, dorsal margin forming a rather bold and quite even arch, ventral very slightly sinuated in front of the middle and gently bowed behind, joining the hind edge without any intervening angle, anterior extremity narrowly rounded, posterior obliquely blunted, with the upper corner considerably produced in the form of an obtuse protuberance well defined above by a distinct sinus of the dorsal margin;—seen dorsally oblong oval in outline, with the greatest width somewhat in front of the middle and about equal to  $\frac{1}{3}$  of the length, both extremities gradually contracted and nearly equal.—Valves rather thin and fragile, with the surface smooth, but clothed everywhere with scattered rather long hairs; marginal zone comparatively broader than in the other known species and crossed by well-marked distant pore-channels. Anterior antennæ rather slender, with the 1st joint of the terminal part nearly as long as the distal segment of the basal one, but somewhat shorter than the next joint, last 2 joints combined exceeding half the length of the preceding one. Posterior antennæ with the dividing suture of penultimate joint located about in the middle, apical claws very short. Legs of a similar structure to that in the preceding species.

*Male* rather smaller than female and having the shell less vaulted above. Copulative appendages resembling in structure those in *P. ensiforme*, but with the basal part comparatively broader, and the terminal part exerted to a very thin and sharp point.

Colour of shell not yet ascertained.

Length of adult female amounting to 0.90 mm.

*Remarks*.—Of this form at first only 2 empty shells were known to me; but subsequently I have had the opportunity of examining some perfect speci-



mens, and have thereby convinced myself, that this form is in reality a true member of the present genus, in spite of the somewhat anomalous appearance of the shell. It is much the largest of the species known to me. The form recorded by Brady under the above name is not this species, but unquestionably that next described.

*Occurrence*.—The 2 empty shells originally examined were found by my late father in shell-sand from Øxfjord, West Finmark; those subsequently obtained were, as far as I remember it, taken off the Lofoten islands in a few fathoms' depth.

*Distribution*.—Apparently not yet known out of Norway.

146. **Paradoxostoma Bradyi**, G. O. Sars (new name).

(Pl. CXVIII, fig. 1).

*Paradoxostoma obliquum*, Brady, Mon. Brit. Ostracoda, p. 459, Pl. XXXV, figs. 18–21  
(not G. O. Sars).

*Specific Characters*.—*Female*. Shell more tumid than in the other known species, seen laterally, short oval in shape, greatest height a little behind the middle and considerably exceeding half the length, dorsal margin evenly arched throughout, ventral very slightly sinuated in front of the middle and gently bowed behind, anterior extremity obtusely rounded off at the end, posterior produced a little above the middle to a short protuberance well defined both above and below;—seen dorsally, regularly oblong oval in outline, with the greatest width nearly equal to half the length, both extremities obtusely pointed. —Valves of rather firmer consistency than in *P. obliquum* and only slightly pellucid, surface perfectly smooth and almost bare from hairs, marginal zone narrow, with no sharply-marked pore-channels. —Anterior antennæ rather prolonged, with the 2nd joint of the terminal part fully twice as long as the 1st. Posterior antennæ resembling in structure those in *P. obliquum*, except that the dividing suture of penultimate joint is located somewhat above the middle. Maxillæ with a distinct rudiment of palp in the form of a simple curved seta issuing from a somewhat thickened base, innermost masticatory lobe comparatively more fully developed than in the type species, with 3 apical setæ. Legs of the usual structure.

Colour of shell in the living animal not yet ascertained; but in the preserved specimens examined by me there are distinct traces of 3 transverse dark bands, one in the middle and one at each extremity.

Length of adult female 0.68 mm.

*Male* unknown.



*Remarks.*—The present form has been erroneously identified by Brady with *P. obliquum*, and must of course have a new specific name. I propose to name it as above. It may be easily recognized both from *P. obliquum* and most other species by the rather short and clumsy shape of the shell.

*Occurrence.*—I have had an opportunity of examining 3 well-preserved female specimens of this form. They were found in my material of *Paradoxostoma* collected at different times and in different places of the Norwegian coast, the exact locality where they occurred not being ascertained.

*Distribution.*—British Isles.

#### 147. *Paradoxostoma hibernicum*, Brady.

(Pl. CXVIII, fig. 2).

*Paradoxostoma hibernicum*, Brady, Mon. Brit. Ostracoda, p. 460, Pl. XXXV, figs. 35—38.

Syn: *Paradoxostoma sarnlense*, Brady.

„ — *rotundatum*, G. W. Müller.

*Specific Characters.*—*Female.* Shell, seen laterally suboval or elliptical in shape, greatest height in the middle and scarcely exceeding half the length, dorsal margin gently arched and sloping nearly at a straight course to the hind end of the shell, ventral margin very slightly sinuated in front and evenly bowed behind, anterior extremity obtusely rounded off, posterior gradually contracted to an obtuse corner not sharply defined either above or below;—seen dorsally oblong oval in outline, with the greatest width in the middle and about equal to  $\frac{2}{5}$  of the length, both extremities obtusely pointed and nearly equal. Valves thinner and more pellucid than in the preceding species and almost bare from hairs.—Anterior antennæ comparatively less prolonged, with the 2nd joint of the terminal part not nearly twice as long as the 1st. Posterior antennæ likewise somewhat stouter than in *P. Bradyi*, but otherwise of a rather similar structure. Legs comparatively short and stout, with the last joint less prolonged than in the other known species.

Colour of shell not yet ascertained.

Length of adult female 0.58 mm.

*Male* not observed.

*Remarks.*—I think I am right in identifying the above-described form with Brady's species, though the figures given by that author in his Monograph do not fully agree with those here reproduced. Yet, in a subsequent memoir, edited by Brady and Norman in common, new figures of the shell have been given, and these figures are in better accordance with the form examined by me. The species seems to be nearest allied to *P. Bradyi*, but is of much

smaller size and differs moreover conspicuously in the general shape of the shell. The form recorded by G. W. Müller from the Gulf of Naples under the name of *P. rotundatum* I am unable to distinguish from the present species.

*Occurrence*.—Some few specimens of this form, all of the female sex, were found in my material of *Paradoxostoma*, the exact locality not being noted.

*Distribution*.—British Isles, Mediterranean.

#### 148. *Paradoxostoma pulchellum*, G. O. Sars.

(Pl. CXVIII, fig. 3).

*Paradoxostoma pulchellum*, G. O. Sars, *Oversigt af Norges marine Ostracoder*, p. 95.

*Specific Characters*.—*Female*. Shell much compressed, seen laterally, oval or more properly semilunar in shape, greatest height in the middle and about equal to half the length, dorsal margin forming a bold and quite even curve throughout sloping somewhat more steeply behind than in front, ventral margin almost straight, both extremities somewhat deflexed and in quite the same manner obliquely rounded off at the end;—seen dorsally, very narrow lancet-shaped, with the greatest width a little in front of the middle and not even attaining  $\frac{1}{4}$  of the length, extremities narrowly contracted and pointed, in particular the anterior one. Valves rather thin, with the surface perfectly smooth and shining; inner duplicatures comparatively broad.—Anterior antennæ moderately slender, with the 1st joint of the terminal part somewhat longer than the 2nd. Posterior antennæ with the distal part very narrow and prolonged, dividing suture of penultimate joint located somewhat below the middle, apical claw of moderate length. Mandibular palp exceedingly slender and distinctly 3-articulate. Maxillæ, as in the type species, without any trace of a palp. Legs thin, resembling in structure those in *P. variabile*.

Colour of shell rather characteristic, a broad transverse band of a dark violaceous hue occupying the greater part of its extent, extremities pellucid and tinged with golden yellow.

Length of adult female scarcely exceeding half a millimeter.

*Male* unknown.

*Remarks*.—The present form is easily recognisable from any of the other species here described, being well distinguished both by the general shape of the shell and by its beautiful colour. It is one of the smallest species known.

*Occurrence*.—I first found this form at Vallø, lower part of the Oslo Fjord, among algæ near the beach, and have more recently also met with it at



Skutesnæs, south west coast of Norway. Norman has moreover taken it at Lervik, Hardanger Fjord. All the specimens examined by me were of the female sex.

*Distribution*.—British Isles.

149. *Paradoxostoma abbreviatum*, G. O. Sars.

(Pl. CXIX, fig. 1).

*Paradoxostoma abbreviatum*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 94.

Syn: *Paradoxostoma coecum*, G. W. Müller.

*Specific Characters*.—*Female*. Shell rather compressed, seen laterally, sort oval in shape, much broader behind than in front, greatest height about equal to  $\frac{3}{5}$  of the length, dorsal margin gently arched, sloping rather steeply behind, ventral margin very slightly sinuated in front and considerably bowed behind, anterior extremity narrowly rounded and somewhat oblique below, posterior much broader and terminating in a blunt corner;—seen dorsally, rather narrow, lancet-shaped, with the greatest width in the middle and not nearly attaining  $\frac{1}{3}$  of the length, anterior extremity more sharply pointed than the posterior. Valves thin and pellucid, with the surface smooth and polished. Eye well observable in the living animal, but, as usual, soon vanishing in preserved specimens.—Anterior antennæ moderately slender, with the 2nd joint of the terminal part very narrow and fully twice as long as the 1st. Posterior antennæ with the 1st joint of the terminal part rather dilated, dividing suture of penultimate joint located a little above the middle, vesicle leading to the flagellum deeply cleft into 2 diverging rami. Legs comparatively thin, and of the usual structure.

*Male* a little smaller than female and having the shell comparatively less vaulted dorsally. Vesicle leading to the flagellum of the posterior antennæ much larger than in female, with the rami club-shaped. Copulative appendages distinguished by the peculiar development of the terminal part, which is produced in the form of a very long falciform curved spine, basal lamella of moderate size and securiform in shape.

Colour of shell clear yellowish, tinged at the extremities with orange, and exhibiting in the centre a rounded patch of a dark brownish hue.

Length of adult female 0.58 mm.

*Remarks*.—This is a well recognizable species, and I am perplexed to see that Brady at first (in his Monograph) has uttered some doubt about its distinctness from *P. variable*, to which species it does not in reality present



any closer resemblance, either in the shape of the shell or in its colour. It is moreover of much smaller size. The form recorded by G. W. Müller from the Gulf of Naples under the name of *P. coecum* is unquestionably the same species. The specimens examined by him were taken from preserved material, and the inadequate specific name given to this form on the wrong supposition, that the eye was wanting, may thereby most likely find its explanation.

*Occurrence*.—I have taken this form not unfrequently in the upper part of the Oslo Fjord, as also in several other places, both on the south and west coasts of Norway. It is a strictly littoral species, occurring near the beach among algæ.

*Distribution*.—British Isles, Fosse de Cap Breton, Bay of Biscay, Holland, Mediterranean, Kerguelen.

*Fossil*.—Scotland, South Wales.

#### 150. *Paradoxostoma Normani*, Brady.

(Pl. CXIX, fig. 2).

*Paradoxostoma Normani*, Brady, Mon. Brit. Ostracoda, p. 458, Pl. XXXV, figs. 39, 40.

Syn: *Sclerochilus contortus* var. *abbreviata*, Brady & Robertson.

*Specific Characters*.—*Female*. Shell less compressed than in the preceding species, seen laterally, oval subreniform in shape, rather broad behind and much narrowed in front, greatest height only slightly exceeding half the length, dorsal margin forming a bold and quite even curve throughout, ventral margin deeply sinuated in front and considerably bowed behind, anterior extremity distinctly deflexed and narrowly rounded at the end, posterior much broader and terminating in a blunt corner;—seen dorsally, regularly oblong oval in outline, with the greatest width about equal to  $\frac{2}{5}$  of the length, both extremities pointed. Valves, as in the preceding species, very thin and highly transparent. Anterior antennæ comparatively less slender, with the 2nd joint of the terminal part not nearly attaining twice the length of the 1st. Posterior antennæ rather like those in *P. abbreviatum*, vesicle leading to the flagellum however comparatively smaller, though distinctly cleft. Legs of the usual structure.

*Male* somewhat resembling that of the preceding species, but with the shell, seen laterally, narrower and more distinctly sinuated below. Copulative appendages rather dissimilar, with the basal part rounded triangular in outline and produced at the end in front to a beak-like deflexed prominence; terminal part only slightly prolonged, resembling the said prominence both in size and shape; basal lamella very small.

Colour of shell whitish pellucid, tinged with pale yellow.

Length of adult female scarcely exceeding half a millimeter.

*Remarks.*—Owing to a certain resemblance in the shape of the shell with *Sclerochilus contortus*, the present form was at first by Brady and Robertson erroneously regarded as merely or peculiar variety of that Cytherid. It is however in reality very different and unquestionably a true member of the genus *Paradoxostoma*, being apparently nearly allied to *P. abbreviatum*, though well distinguished by the less compressed shell and by the deep sinus of the ventral margin, as also by its much inferior size.

*Occurrence.*—I have taken this form occasionally in some places on the south coast of Norway, Risør, Korshavn, in the littoral zone among algæ.

*Distribution.*—British Isles, Fosse de Cap Breton, Bay of Biscay.

# 151. *Paradoxostoma* (?) *rostratum*, G. O. Sars.

(Pl. CXIX, fig. 3).

*Paradoxostoma rostratum*, G. O. Sars, Oversigt af Norges marine Ostracoder, p. 97.

*Remarks.*—I do not find it appropriate here to give any detailed description of this rather doubtful species, of which as yet only 2 detached valves (both left) have come under my notice. Yet, for the sake of completeness, copies of my original drawings are added on the accompanying Plate fig. 3.

As to the systematic position of this form, I am by no means assured that it in reality is referable to the present genus. The shape of the shell is indeed rather dissimilar to that in the other known species, and bears some resemblance to the shell in the genus *Cytherideis*; but the inner duplicatures are distinctly different, and in particular is their peculiar flexure at the interior extremity very remarkable and unlike the case in any other Ostracod known to me. Indeed, the true systematic relation of the present form can only be settled by an anatomical investigation of fresh specimens.

*Occurrence.*—The 2 detached valves originally examined by me were found by my late father in shell-sand from Øxfjord, West Finmark. In his most recent publication 1896 Norman notes the finding of 3 specimens of this peculiar form between tide marks at Vadsø, without however giving any further information about the species.

*Distribution.*—As yet only known from the Finmark coast.





## LIST OF PLATES.

The following are the chief markings of the figures with their significations:

♀: Female,—♂: Male,—*l.*, *r.*, *d.*, *v.*, *fr.*: left, right, dorsal, ventral, frontal views of shell,—*V.l.*, *r.*: left or right valve,—*fr. m.*: frontal margin of valve,—*muscl. sp.*: muscular spots,—*sculpt.*: sculpture,—*R.*: rostre,—*H.*: hinge,—*E.*: eye,—*oc.*: ocellus,—*t.*: tentacle,—*a*<sup>1</sup>: anterior antenna,—*a*<sup>2</sup>: posterior antenna,—*r. i.*: inner ramus,—*L.*: anterior lip,—*M.*: mandible,—*m.*: maxilla,—*mp.*: maxilliped,—*p.*: legs,—*urs.*: urosome,—*C.*: caudal lamella or ramus,—*cop. app.*: copulative appendages of male,—*ej. t.*: ejaculatory tube,—*T.*: testicle,—*Sp.*: Spermatozoids,—*ov.*: ovarial tube.

### Pl. I.

*Cypridina norvegica*, Baird.

### Pl. II.

*Cypridina norvegica* (continued).

### Pl. III.

*Cypridina norvegica*, female and male.

### Pl. IV.

*Cypridina megalops*, G. O. Sars.

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*Philomedes globosus*, (Lilljeborg).

### Pl. VI.

*Philomedes globosus* (continued).

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*Philomedes globosus*, male.

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*Philomedes Lilljeborgi*, G. O. Sars.

### Pl. IX.

*Asterope Mariæ*, (Baird).

### Pl. X.

1. *Asterope Mariæ* (continued).
2. *Asterope abyssicola*, G. O. Sars.

### Pl. XI.

*Conchoecia elegans*, G. O. Sars.

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*Conchoecia elegans* (continued).

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1. *Conchoecia borealis*, G. O. Sars.
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*Polycope orbicularis*, G. O. Sars.

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1. *Polycope orbicularis*, male.
2. *Polycope punctata*, G. O. Sars.

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1. *Polycope areolata*, G. O. Sars.
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1. *Polycope sublaevis*, G. O. Sars.
2. *Polycopsis compressa*, (Brady & Robertson).

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*Cytherella abyssorum* (continued).

### Pl. XX.

*Pontocypris trigonella*, G. O. Sars.

### Pl. XXI.

*Erythrocypris mytiloides*, (Brady).

## Pl. XXII.

*Erythrocypris mytiloides*, male.

## Pl. XXIII.

1. *Erythrocypris hispida*, G. O. Sars.
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## Pl. XXIV.

*Argilloecia cylindrica*, G. O. Sars.

## Pl. XXV.

*Argilloecia conoidea*, G. O. Sars.

## Pl. XXVI.

*Macrocypris minna*, (Baird).

## Pl. XXVII.

*Macrocypris minna* (continued).

## Pl. XXVIII.

*Macrocypris angusta*, G. O. Sars.

## Pl. XXIX.

*Bythocypris bosquetiana*, Brady.

## Pl. XXX.

1. *Bythocypris obtusata*, G. O. Sars.
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*Paracypris polita*, G. O. Sars:

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*Candona candida*, (O. Fr. Müller).

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*Candona candida* (continued).

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1. *Candona neglecta*, G. O. Sars.
2. *Candona lapponica*, Ekman.

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*Candona caudata*, Kaufmann.

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*Candona Sarsi*, Hartwig.

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1. *Candona marchica*, Hartwig.
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1. *Cryptocandona Vavrai*, Kaufmann.
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*Candonopsis Kingsleyi*, (Brady & Robertson).

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*Notodromas monachus*, (O. Fr. Müller).

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1. *Ilyocypris gibba*, (Ramdohr).
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*Cypris pubera*, O. Fr. Müller.

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*Eucypris virens*, (Jurine).

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## Pl. LV.

1. *Cypricercus affinis*, (Fischer).
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1. *Cyprinotus salinus*, (Brady).
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## Pl. LVII.

*Heterocypris incongruens*, (Ramdohr).

## Pl. LVIII.

*Dolerocypris fasciata*, (O. Fr. Müller).

## Pl. LIX.

*Herpetocypris reptans*, (Baird).

## Pl. LX.

*Prionocypris lutaria*, (Koch).

## Pl. LXI.

1. *Prionocypris glacialis*, G. O. Sars.
2. *Prionocypris pigra*, (Fischer).

## Pl. LXII.

*Prionocypris olivacea*, (Brady & Norman).

## Pl. LXIII.

*Pionocypris vidua*, (O. Fr. Müller).

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1. *Pionocypris helvetica*, (Kaufmann).
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1. *Pionocypris Almi*, G. O. Sars.
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*Cypridopsella villosa*, (Jurine).

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*Darwinula Stevensoni*, (Brady & Robertson).

## Pl. LXVIII.

*Limnocythere Sancti Patricii*, Brady & Robertson.

## Pl. LXIX.

1. *Limnocythere Sancti Patricii* (continued).
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## Pl. LXX.

*Cytherissa lacustris*, G. O. Sars.

## Pl. LXXI.

*Cyprideis littoralis*, (Brady).

## Pl. LXXII.

1. *Cyprideis littoralis* (continued).
2. *Cyprideis sorbyana*, (Jones).

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*Cytheridea papillosa*, Bosquet.

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*Cythere lutea*, O. Fr. Müller.

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1. *Leptocythere castanea*, G. O. Sars.
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## Pl. LXXXI.

*Cytheromorpha fuscata*, (Brady).

## Pl. LXXXII.

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## Pl. LXXXIII.

*Kyphocythere limicola*, (Norman).

## Pl. LXXXIV.

*Hemicythere villosa*, G. O. Sars.

## Pl. LXXXV.

1. *Hemicythere emarginata*, G. O. Sars.
2. *Hemicythere crenulata*, G. O. Sars.
3. *Hemicythere finmarchica*, G. O. Sars.



## Pl. LXXXVI.

1. *Hemicythere quadridentata*, (Baird).
2. *Hemicythere angulata*, G. O. Sars.
3. *Hemicythere latimarginata*, (Speyer).

## Pl. LXXXVII.

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2. *Hemicythere oblonga*, (Brady).

## Pl. LXXXVIII.

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## Pl. LXXXIX.

*Cythereis dunelmensis*, (Norman).

## Pl. XC.

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## Pl. XCI.

*Cythereis Jonesi*, (Baird).

## Pl. XCII.

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## Pl. XCIV.

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2. *Cytherura similis*, G. O. Sars.

## Pl. XCV.

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2. *Cytherura atra*, G. O. Sars.

## Pl. XCVI.

1. *Cytherura intumescens*, G. O. Sars.
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2. *Cytherura producta*, Brady.

## Pl. XCVIII.

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2. *Cytherura lineata*, Brady.

## Pl. XCIX.

1. *Cytherura undata*, G. O. Sars.
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## Pl. C.

1. *Cytherura clathrata*, G. O. Sars.
2. *Cytherura cellulosa*, (Norman).

## Pl. CI.

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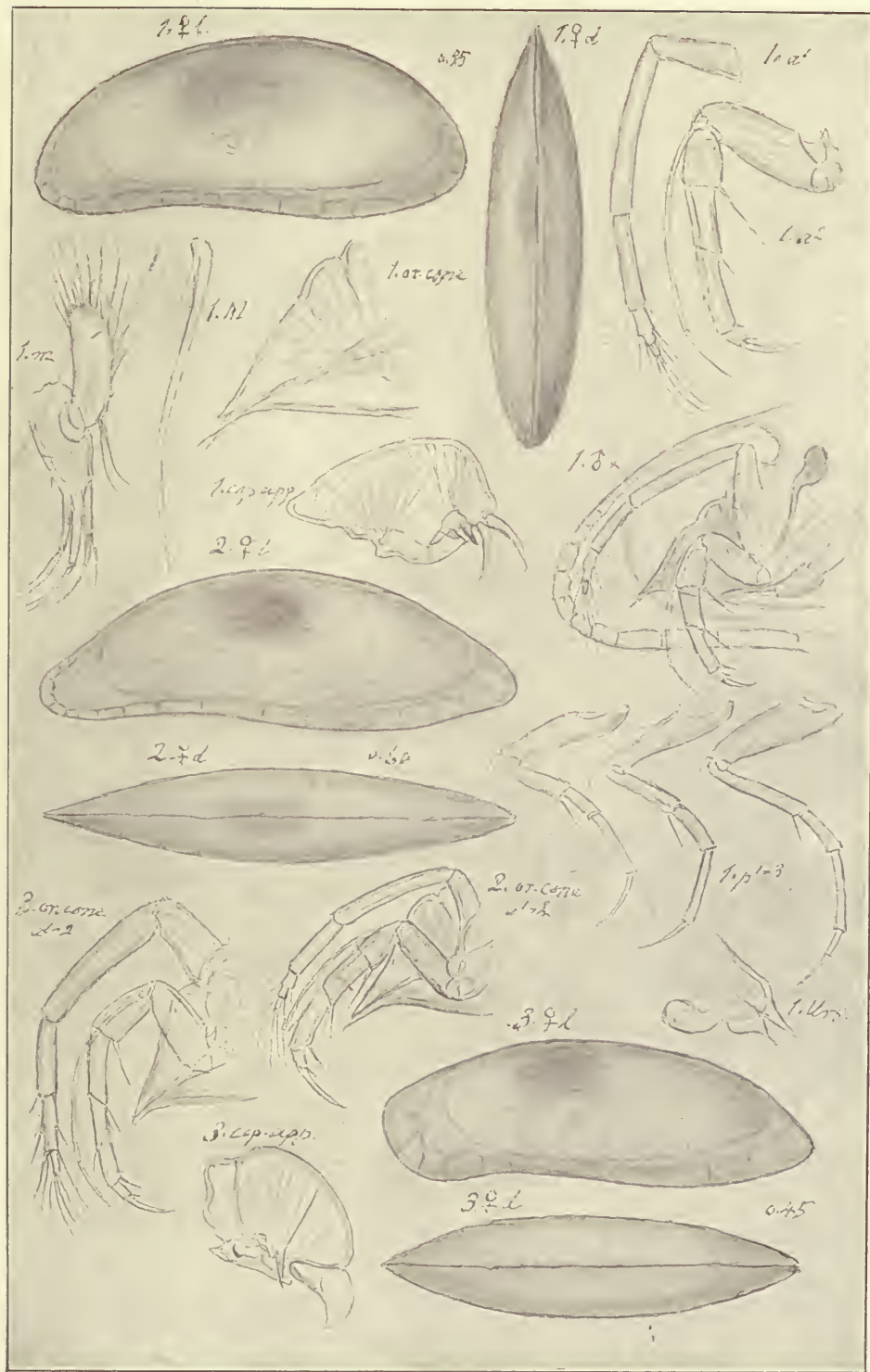


# Ostracoda

Cytheridæ

Podocopa

Pl. CXIII



G. O. Sars del.

1. Paracytherois arcuata, (Brady)
2. — flexuosa, (Brady)
3. — producta, (Brady)



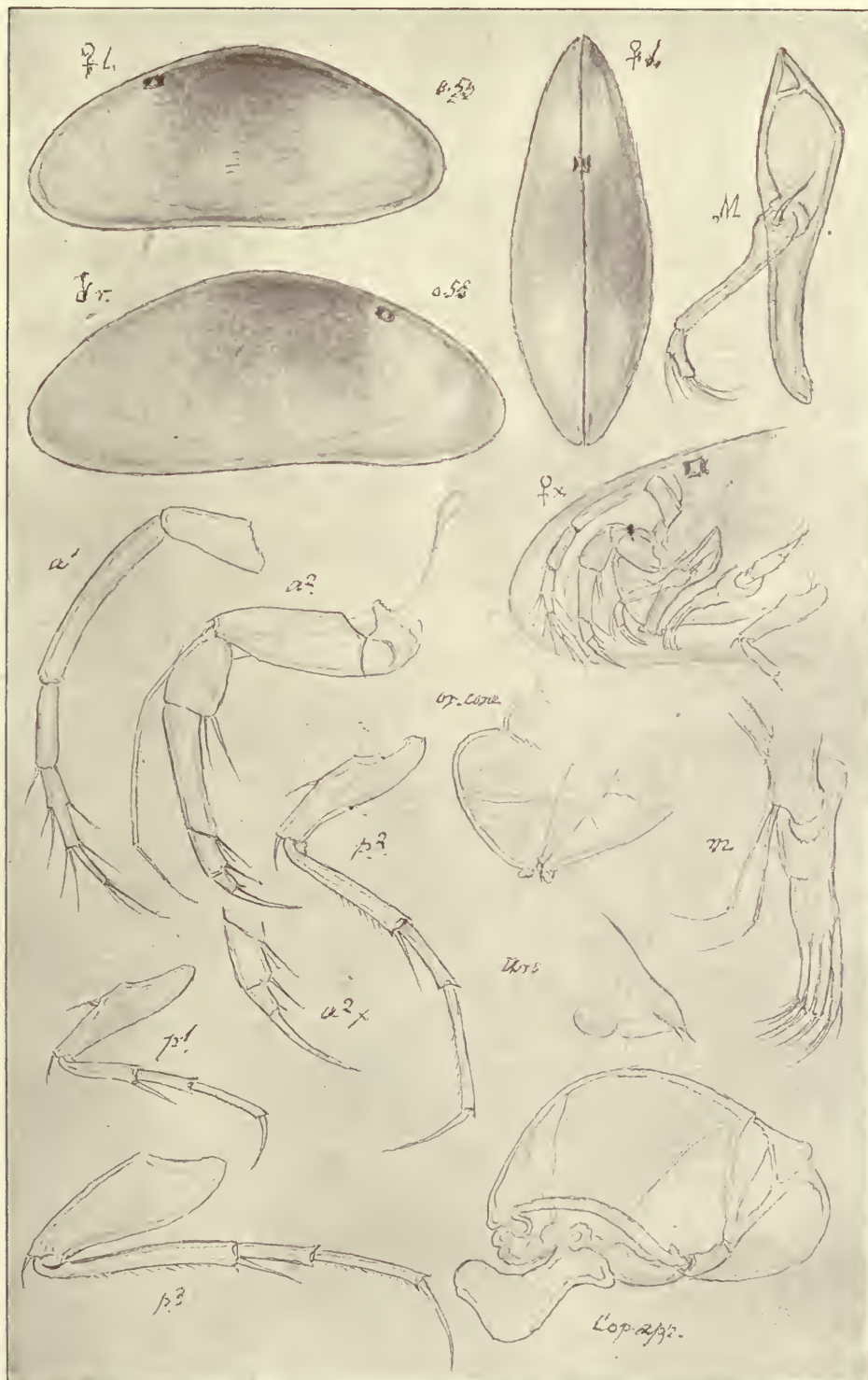


# Ostracoda

Cytheridæ

Podocopa

Pl. CXIV



G. O. Sars del.

Cytheroidea Fischeri, G. O. Sars



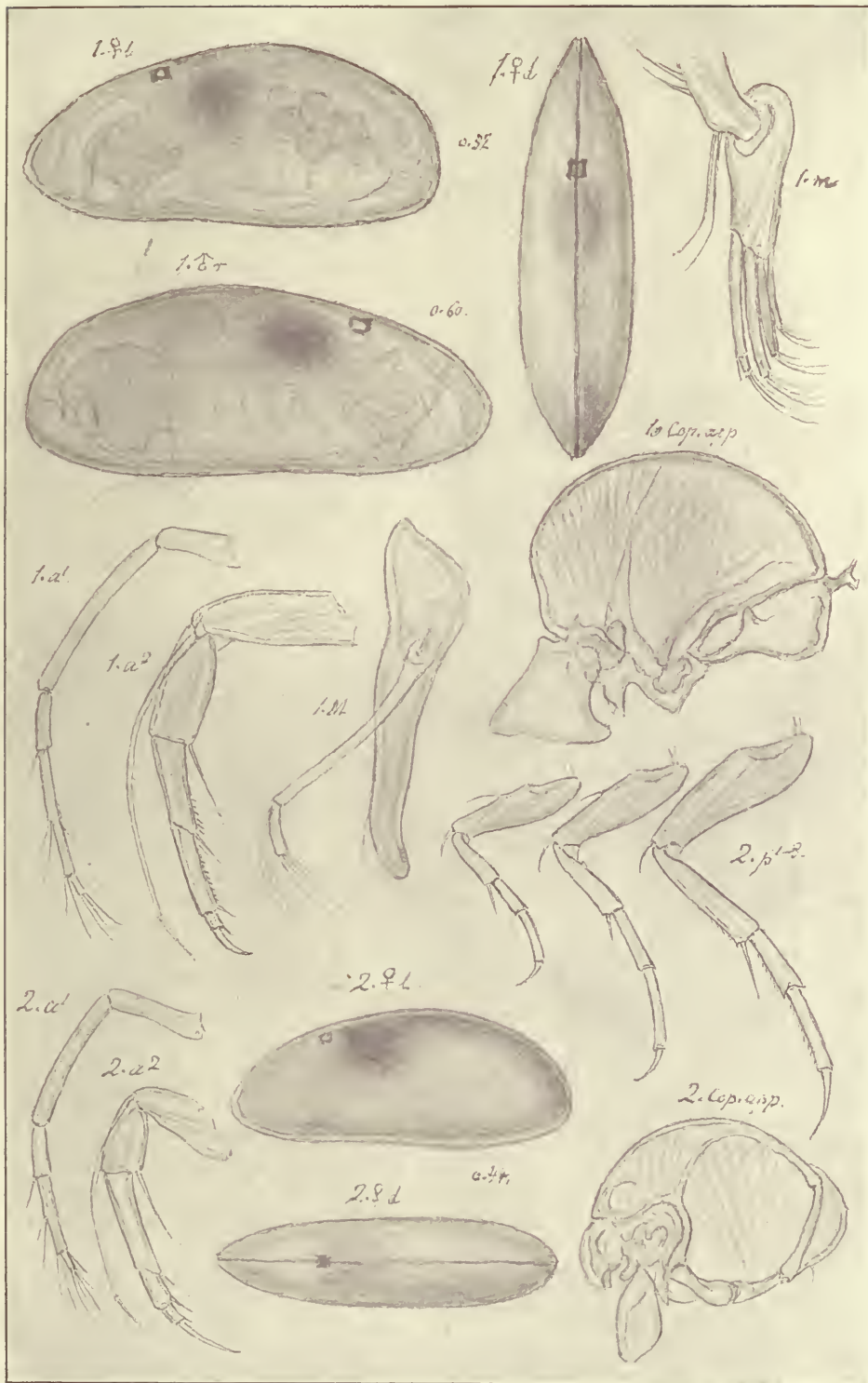


# Ostracoda

Cytheridæ

Podocopa

Pl. CXV



G. O. Sars del.

1. *Cytherois vitrea*, G. O. Sars
2. — *pusilla*, G. O. Sars

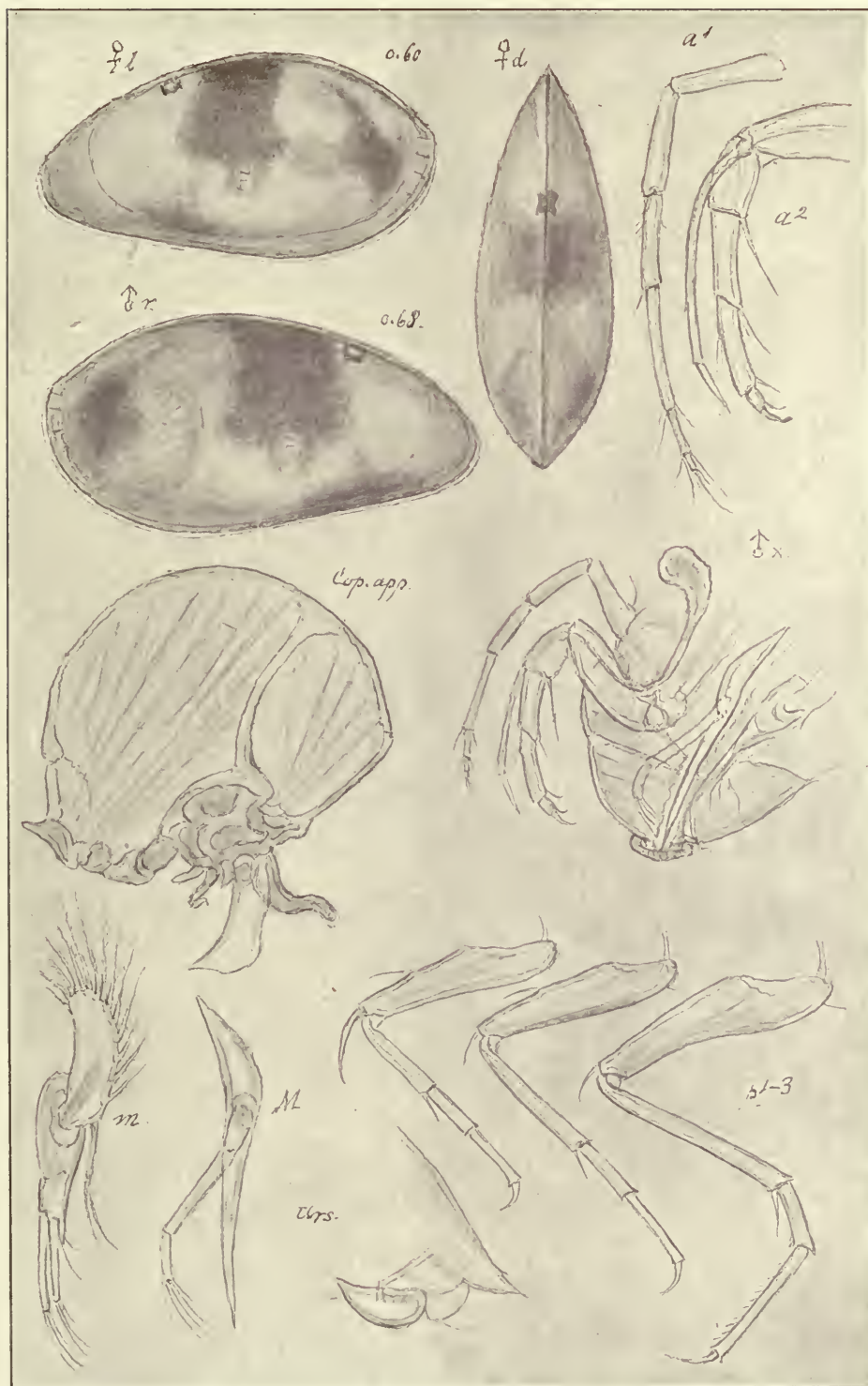


# Ostracoda

Cytheridæ

Podocopa

Pl. CXVI



G. O. Sars del.

*Paradoxostoma variabile*, (Baird)



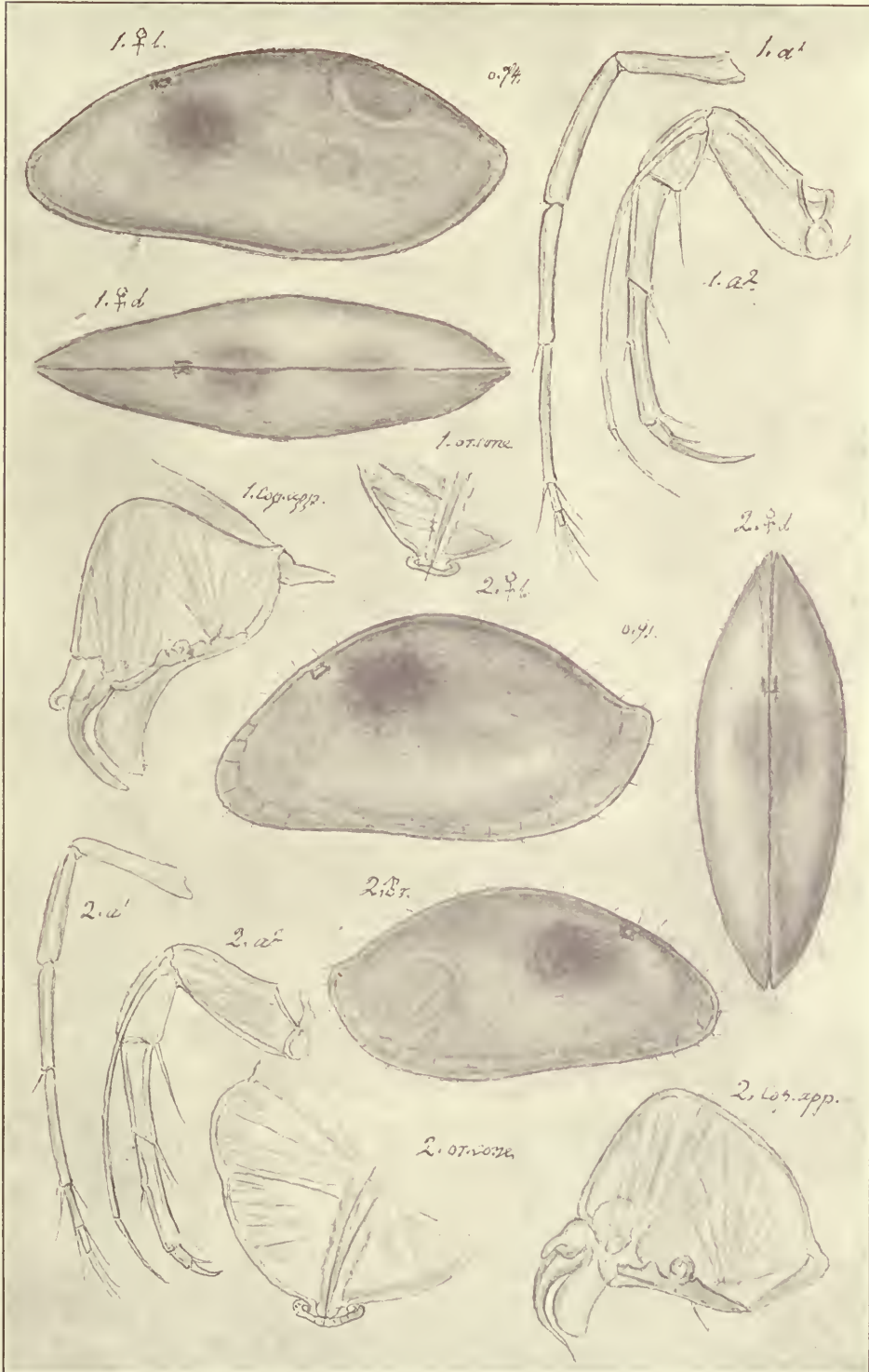


# Ostracoda

Cytheridæ

Podocopa

Pl. CXVII



G. O. Sars del.

1. *Paradoxostoma ensiforme*, Brady
2. — *obliquum*, G. O. Sars



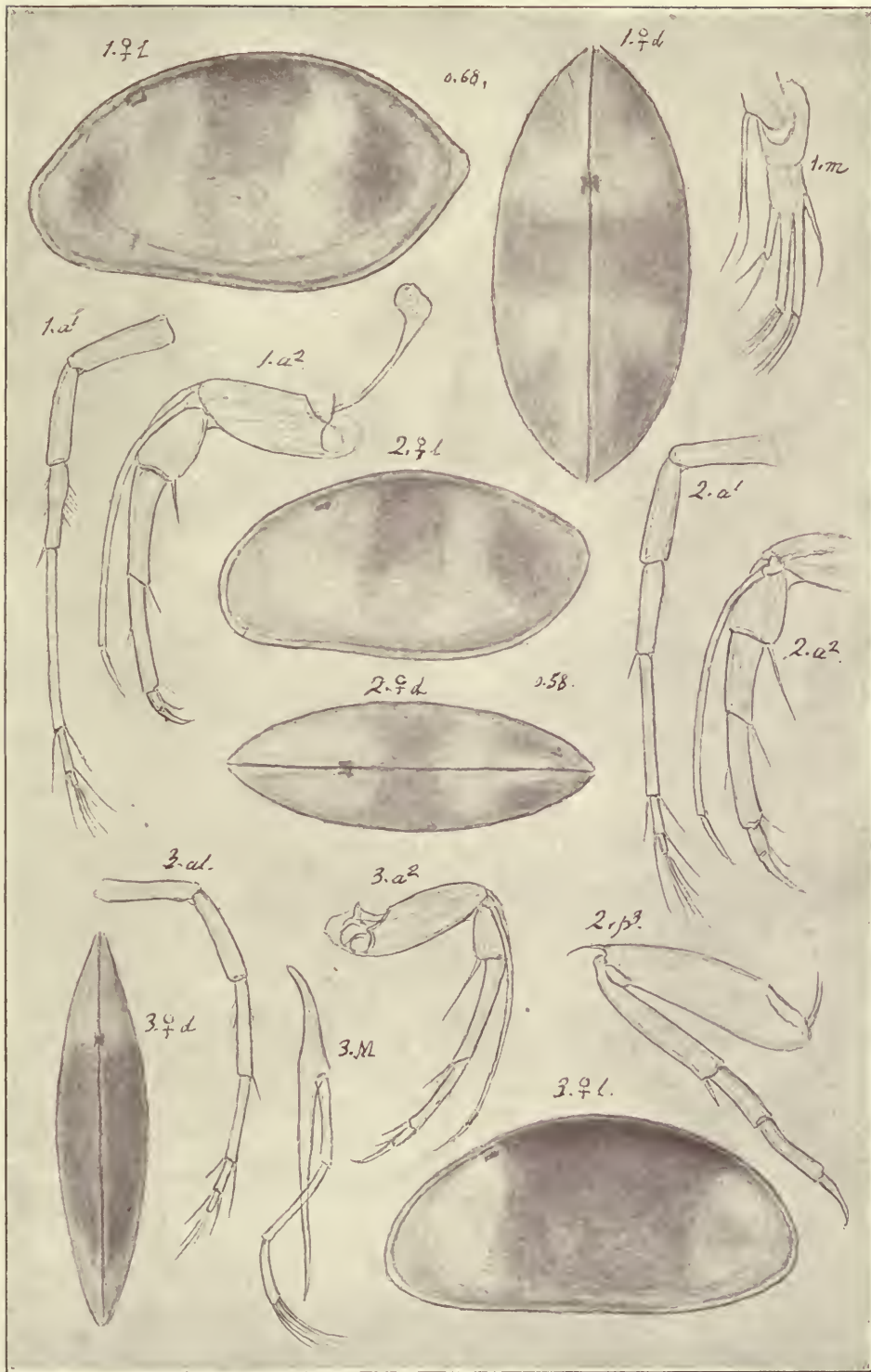


# Ostracoda

Cytheridæ

Podocopa

Pl. CXVIII



G. O. Sars del.

1. *Paradoxostoma* Bradyi, G. O. Sars
2. — *hibernicum*, Brady
3. — *pulchellum*, G. O. Sars

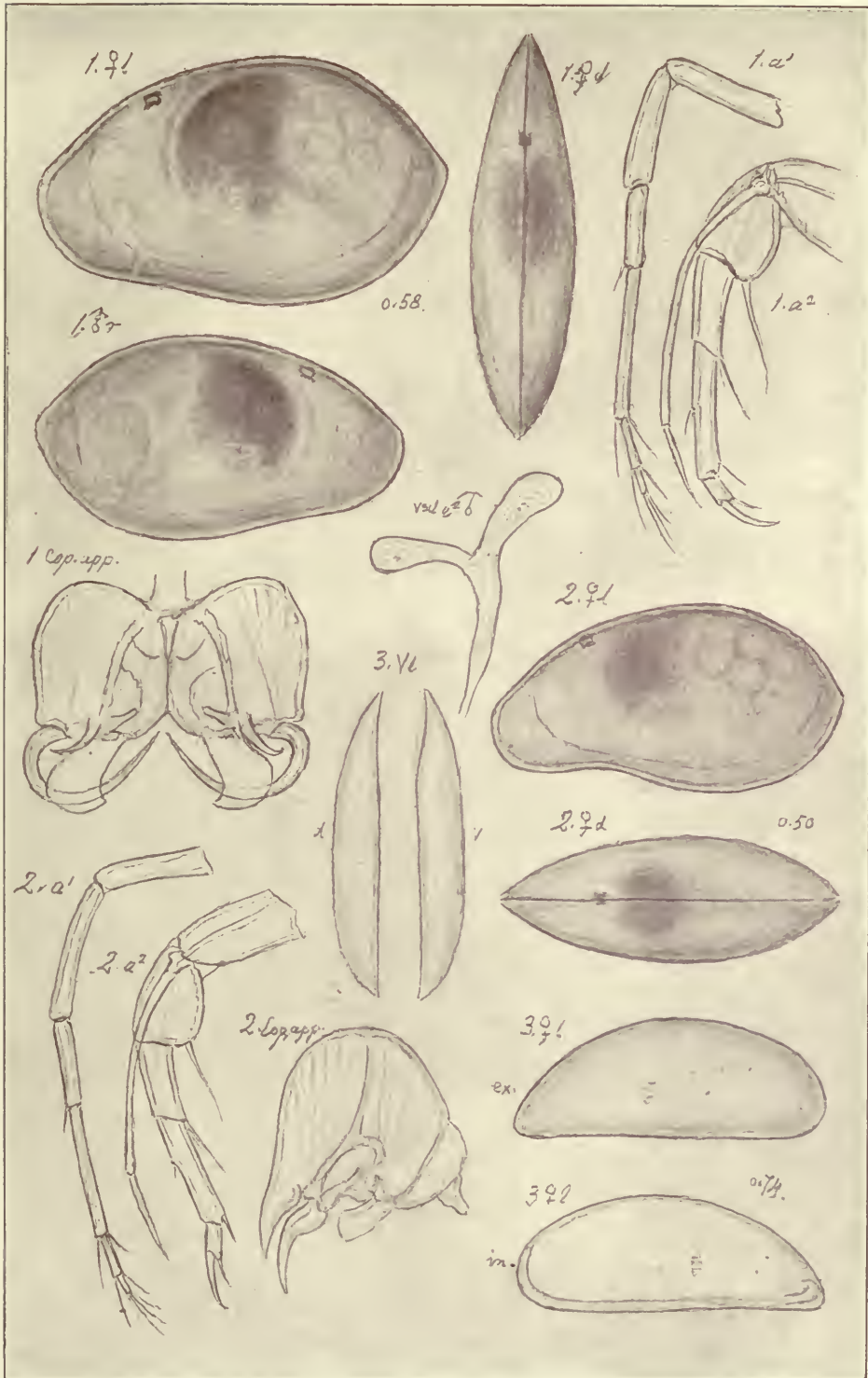


# Ostracoda

Cytheridæ

Podocopa

Pl. CXIX



G. O. Sars del.

1. *Paradoxostoma abbreviatum*, G. O. Sars
2. — *Normani*, Brady
3. — *rostratum*, G. O. Sars



















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